

# Index

**Note to the Reader:** Throughout this index **boldfaced** page numbers indicate primary discussions of a topic. *Italicized* page numbers indicate illustrations.

## A

- About Autodesk Revit Architecture 2012
  - dialog box, 198, 199
- Absolute option for keynotes, 780
- Abstract Phase setting, 482, 482
- ACADInterop folder, 243
- accelerators, keyboard, **82**, 82
- Accept Difference option, 218
- Accept Primary button, 416
- AccuRender tool, 999
- acdb.pat file, 243
- Acquire Coordinates tool, 201, 351
- acquiring coordinates, **201–202**, 202
- Activate View option, 766
- active worksets, 69
- Actual Bracket Space formula field, 638, 638
- Adaptive Component family,  
**559–560**, 559–560
- adaptive components, 860, 860
- adaptive points, 546–548
- Add/Edit Layer Modifiers, 249, 249
- Add-ins tab, 943
- Add options
  - filters, 120
  - group elements, 403, 724, 724
  - labels, 797
  - line weights, 103
  - revisions, 866
  - schedules, 156, 341, 561
  - selection elements, 62
  - sweep rows, 513
- Add Parameter options, 633, 635, 639, 800
- Add Point tool, 590
- Add Points From Selected Layers dialog box,  
86, 86
- Add/Remove Segments button, 531–532
- Add Split Line tool, 590–591, 591
- Add To Design Set dialog box, 413, 413
- Add To Set option, 413

- .addin manifest files
  - external command registration, 943, **948–950**
  - sample project, **967–968**, 967, 969
- AddInId tag, 949
- additive approach
  - selection, 62
  - templates, 135, 135
  - wall storage, 502
- AddRibbonPanel function, 966–967
- Administration Building at Singapore Polytechnic, 895, 896
- ADN (Autodesk Developer Center and Developer Network), 970
- adoption curves, **10–11**, 10–11
- ADSK format, 203
- AEC Headquarters, **885–886**, 885–886
- afterburners, 1003, 1004
- aggregating template data, **136–139**, 137–139
- AIA (American Institute of Architects), 195
- airlock, 973, 983, 983, 989, 989, 996–997, 996–997
- Alcatraz set, 1000, 1000–1001
- Align tool
  - elements, 74–75, 75
  - layers, 518, 519
- Align With Element option
  - filled regions, 713, 713
  - patterns, 113
- Aligned To Current View option, 81
- Aligned To Picked Level option, 81
- Aligned To Same Place option, 81, 622
- Aligned To Selected Levels option, 81
- Aligned To Selected Views option, 81
- aligning
  - elements, **74–75**, 75
  - layers, 518, 519
- with pasting, **80–81**, 81, 622
- pattern orientation, 113

All Grid Lines option, 528  
 all instances, selecting, 63, 139, 181  
 Allow Join option, 76  
 Along Horizontal Grid option, 529, 530  
 Alphabetical material option, 111  
 ambient lighting, 462–464, 462–464  
 American Institute of Architects (AIA), 195  
 analysis in BIM, 8–9, 8–9  
 Analysis Output tab, 376–378, 377  
 analytic extents, 20–29, 21–28  
 analytic visualization, 437  
     design elements identification,  
         **445–446**, 446  
     monochromatic views, **437–440**, 438–440  
     project parameters, **440–442**, 440–443  
     sun and shadow studies,  
         **446–450**, 447–449  
     user-defined parameters,  
         **443–445**, 443–445  
 Analyze Mass Model dialog box, 361–362, 361  
 Analyze tab, 359–360, 359  
 angles  
     arrays, 73  
     complex mass family rotation, 333, 333  
 angular twists, 319–320  
 animated solar studies  
     creating, **354–355**, 449, 449  
     exporting, **355–356**, 356–357  
     previewing, **355**, 355  
 animation paths for photorealistic  
     visualization, **473–480**, 473–479  
 Annotation Objects tab, 102  
 annotations and Annotate tab, 58, 58  
     3D views, **821**, 821  
     creating, **125**, 125  
     details, 705, 705  
     dimensions, **794–796**, 794–796  
     keynotes. *See* keynotes  
     overview, **771–772**, 771  
     project parameters, **797–800**, 797–800  
     property lines, 93  
 Region tool, 708, 708  
 revision clouds, 863, 866–867  
 shared parameters, **800–807**, 801–807

tags. *See* tags  
 text, 772  
 API. *See* application programming interface  
 (API)  
 APL parameter, 336, 336  
 Appearance tab  
     materials, 110  
     schedules, 752, 753  
 Application class, **964–966**  
 Application menu, 48, 49, 243, 243  
 application programming interface  
 (API), **941–942**  
     database-level applications, **947**  
     development environment options,  
         **951–952**, 951–952  
     external applications, **945–947**  
     external commands, **943–945**  
     external utility installation, **948–950**  
     resources, **970**  
     sample project. *See* sample project  
 Software Development Kit,  
     **942–943**, 942–943  
 applications  
     database-level, **947**  
     external, **945–947**  
 Apply Area Rules setting, 744  
 Apply Default View Template To All Views  
     option, 124  
 Apply View Template dialog box, 743, 769  
 architects  
     MEP engineer relationship, **198**  
     role, **148**  
     structural engineer relationship, **197–198**  
 arcs, **830–836**, 831–835  
 Area And Volume Computations dialog box  
     area plans, 742–743, 742  
     room area, 740  
     room volumes, 365–366, 366  
 Area Boundary line type, 744  
 Area Plan tool, 742–743  
 area plans  
     adding areas, **745–747**, 745–747  
     complex, 748  
     creating, **742–744**, 743–745

- modifying, 747, 747
  - sheets, 764–766, 766
  - standards, 741–742, 742
  - Area Schemes tab, 742, 742
  - Area tool, 745
  - Area Type property, 744, 746
  - areas
    - parametric models, 848–849, 848–849
    - rooms, 740–741, 740–741
    - scheduled, 42, 754–755, 755
    - tags, 791, 791
  - Arrange panel, 718, 719
  - arranging views, 718–719, 718–719
  - Array command, 634
  - Array tool, 72–74
  - arrays
    - elements, 72–74, 72–73
    - parametric, 634–636, 634–635
  - art directors, 975–976
  - articulation of walls, 510–516, 510–516
  - artificial lighting
    - ceiling, 485–486, 485
    - light groups, 486–495, 486–495
  - as-built documentation, 863
  - aspect ratio, 471–472, 472, 475, 475
  - assemblies
    - creating, 891–892, 892
    - views, 892, 893
  - Assembly tag, 949
  - Associate Family Parameter dialog box, 639, 639
  - associative parameters
    - mass dimensions, 316, 316
    - materials, 639, 639
  - At Library Locations option, 780
  - At Wall Center option, 366
  - Attach End option, 790
  - Attach Top/Base button, 25, 521
  - Attached Detail Groups option, 401
  - Attached Detail Groups Placement dialog box, 401, 401
  - attached relationships in groups, 410, 410
  - attaching walls, 521–522, 521–522
  - Attachment option for linked models, 206
  - Auto - By Shared Coordinates option, 201, 229
  - Auto - Origin To Origin option, 229
  - Autodesk Developer Center and Developer Network (ADN), 970
  - Autodesk Ecotect energy modeling application, 363
  - Autodesk Revit API Discussion Group, 970
  - Automatic Ceiling mode, 577
  - Automatically Embed option, 536, 536
  - AvailabilityClassName tag, 950
  - Avatar*, 1011
  - AVI files, exporting, 478, 478
- B**
- B-25 bomber, 1011–1012, 1011–1012
  - background
    - gradient, 352
    - horizon simulation, 462, 462
    - imported data, 230
    - sun studies, 352, 352
  - Background setting, 462, 462
  - backups for central files, 172
  - Baluster Family category, 677
  - balusters
    - behaviors, 603
    - curtain walls for, 670–671, 671
    - curved railings, 684, 685
    - glass stairs, 696–697, 696, 698
    - handrail joins, 664, 664
    - nesting, 659–661, 660
    - overrides, 654
    - pins as, 696, 696
    - placement, 649, 649, 653, 656, 656, 665, 665, 669, 671
    - support, 677–683, 677–683, 686, 687
    - types, 651–652, 651–652
  - bar top, 1012, 1013
  - barrel roofs, 584
  - Base Extension Distance parameter, 517–519
  - Base Is Attached parameter, 522
  - Base Level option, 581
  - Base Offset setting, 519, 525

- Base Offset From Level setting, 581
- base templates, 135
- baseboard details, 717, 717
- Basic Ceiling family, 577
- Basics tab for linked models, 211
- batt insulation, 723, 723
- BCA (Building Construction Authority), 896–897
- Begin With Riser option, 668
- belts for curtain wall surfaces, 542
- Bentley Structural Modeler, 241
- BEP (BIM execution plan), 882
- best practices
  - Bohlin Cywinski Jackson, **926–927**
  - film and stage, **992–997**, 993–997
  - groups, **409–411**, 410
  - stairs and railings, **699–700**
- Best setting, 468, 468
- bicycles, evolution vs. revolution, 12–13, 13
- BIM (Building Information Modeling)
  - analysis, **8–9**, 8–9
  - execution plans, **194–195**, 882
  - firm culture, **11–13**
  - goal setting, **10–11**, 10–11
  - investment in, **13–14**
  - overview, 3–4
  - planning for, **4–5**, 4
  - quality control, **154**
    - file size, **154–157**, 155–157
    - schedules, **158–161**, 158–161
    - warnings, **161–162**, 161–162
  - staffing, **146–151**, 146–147, 149
  - strategy, **9–10**
  - visualizations, **5–7**, 5–8
  - work plans, **150**
  - workflow, **141–145**, 142–146
- BIM and Construction Management*, 874
- BIM curve, **225**, 226
- BIM execution plan (BEP), 882
- binding links, 408, 408
- blends, 615, 615
  - generic model mass families, 319, 319, 322–325, 323–324
- glass stairs, 697
- in-place solids, 302, 302–303
- pattern-based panels, 291–292, 292–293
- railing paths, 688–689, 688
- blocking
  - details, 716–717, 717
  - placing, 731, 731
- Bohlin Cywinski Jackson (BCJ)
  - Apple stairs, 694, 695
  - background, **924–925**, 924
  - technology history, **925**
- virtualization
  - best practices, **926–927**
  - hardware settings, **927–939**, 927–939
- BOMA (Building Owners and Managers Association), 741–742
- BOMA Area, 741–742
- boot order in virtualization, 935, 935
- Border Tile parameter, 544, 545
- borrowing elements, **182–183**
- boundaries
  - area, 743–744, 743–745, 747
  - filled regions, 715, 715–716
  - line visibility, 766
- brackets, shelf
  - formulas, **636–638**, 636–638
  - modeling, **629–630**, 629–630
  - nesting, **631–633**, 631–632
  - parameters, **633–634**, 633–634
  - parametric arrays, **634–636**, 634–635
- Break Up option, 525
- breaking up
  - models, **151–152**
  - stacked walls, 525
- bricks, 720–721, 720
- bridge elements, 842, 843
- Bring Forward option, **719**, 719
- Bring To Front option, **718**, 718
- Browser Organization dialog box, 119–120
- Browser Organization Properties dialog box, 119, 119
- Build Events dialog box, 968, 969
- builders, **873–874**
- Building Coder blog, 970
- Building Construction Authority (BCA), 896–897

*Building Design + Construction*, 873  
 building envelopes in energy modeling, **363–364**, 364  
 building footprint, **829–839**, 829–835, 837–838  
*Building Information Modeling*. *See BIM (Building Information Modeling)*  
 building massing, **839–845**, 840–846  
 building orientation, 340  
 Building Owners and Managers Association (BOMA), 741–742  
 building pads, **90–91**, 91  
 Building sections, 36–37, 38  
 buildingSMART Alliance, 194, 255  
 bulleted lists, 775, 775  
 button controls, 955  
 By CSI Division option, 111  
 By Keynote option, 781  
 By Mark option, 111  
 By Project option, 866  
 By Range option, 817  
 By Sheet option  
     keynotes, 781  
     revision numbering, 866  
 By Type option, 111  
 By Use option, 111

## C

C# language  
     external application examples, 946–947  
     external command example, 944–945  
     VSTA support, 948  
 cable net for stairs, 686, 687  
 CAD-based workflow, **141**, 142  
 CAD files  
     coordinates from, **201**  
     details from, **758–759**, 759  
     exporting. *See* exporting  
     importing. *See* importing  
     linking  
         vs. importing, **759–760**, 759  
         large files, **233**  
         managing, 228  
     toposurfaces, 85, 86

Calculate All Light Meters Now button, 378  
 Calculate Totals option, 561, 752, 755  
 Calculated Value dialog box  
     schedules, 341–342, 342  
     window-to-wall ratio, 346, 346  
 calculations  
     distances, 721  
     parametric models, **854–858**, 855–857  
         room area, **740–741**, 740–741  
 Callout Detail sections, 36–37  
 Callout tool, 714  
 callouts, **38–39**, 38–39  
 Camera tab, 44  
 camera tool, 372  
 Camera views, 42  
 cameras  
     animation paths, **473–480**, 473–479  
     daylighting views, 372  
     perspective views, **44–46**, 44  
     photorealistic visualization, **471–473**, 471–473  
     solar studies, 348–349, 349  
     visualization sequence, **481–482**, 481–482  
 Carter, Rick, 1011  
 carving geometry, **618–619**, 619, 996  
 case studies  
     J. H. Findorff & Son, **874–880**, 875–880  
     Tocci Building Corporation, **881–886**, 881–886  
 Cast Shadows option, 352, 460, 460  
 categories  
     families  
         film and stage, **993–995**, 994  
         parameters, **601**  
         projection and cut values, **599–600**, 600  
         schedules, **599**, 599  
         selecting, **598–601**, 598–600, 603  
         shared parameters, **802–803**, 802–803  
     Category setting, 800  
 CDE (Conceptual Design Environment), **540**  
 CEA (conceptual energy analysis) tool, **359–362**, 359–361

- ceilings
  - creating, 577
  - lights in, **485–486**, 485
  - reflectance, 371
  - settings, 484, 484
  - sketching, **573–574**, 573
- cell phone adoption, 12
- center of rotation, 71
- center points of arcs, 831–833
- Center To Center positioning, 233
- Center Void Model Lines family, 842
- central files
  - creating, **172–173**, 172–173
  - detaching from, 206–207, 207
  - worksharing, 165
- CGI for film, **990**, 991–992
- chain selections, **62**
- chairs
  - detail level, 452, 452
  - with tubular structure, **623–628**, 623–628
- change management for curtain systems, **853**, 853
- Change Parameter Value dialog box, 794, 794
- Change Time Period button, 375
- Changes Not Saved dialog box, 178, 178
- Check Now option, 183–184
- Chong, Daryl, student project by, **906**, 906–907
- Choose Space Type And Color Scheme dialog box, 116, 117, 811, 811
- circular stairs, **688–690**, 688–691
- clashes, 197, **220–221**
- classes
  - constructors, **956**, **959–960**
  - properties, **960–962**
- classroom activities
  - overview, **895**
  - Singapore Polytechnic. *See* Singapore Polytechnic
- clipped project base points, 204–205
- closing Revit, **186**, 186
- clouds, revision, **863**, 864
  - leaders, **868**
  - placing, **866–867**, 866–867
  - tags, **867–868**, 868
- clsSettings class, **959–962**
- CMUs (concrete masonry units), 112–113, 112
- CNC (computer numerical control), **979–981**, 979–981
- Coarse detail level, 734, 734
- collaboration and Collaborate tab, 58, **58**, 166–167, 167
  - Coordination Review tool, 218
  - Copy/Monitor tool, 213
  - floors, **566**
  - interference checking, 223
  - local files, 175–176
  - permissions, 173, 173, 184
  - Reload Latest process, 179
- color
  - consistent, 455, 455
  - exporting, 252, 252
  - glazing, 371
  - importing and linking, 229
  - layers, 227, 246, 247
  - numerical ranges, **816–817**, 817–818
  - poches, **465–466**, 465–466
  - schemes, **116–118**, 117–118
  - selection, 61
- Color dialog box, 813–814, 814
- color fill legends
  - overview, **809–810**, 809–810
  - program verification with, **818**, 818
  - rooms, **810–817**, 811–812, 814–818
- Colors tab, 252, 252
- columns, copying, **215**
- Comma delimiters, 643, 643
- Comma Separated Values (.csv), 644
- Command class, **962–964**, 962
- CommandData parameter, 943
- commands
  - external, **943–945**
  - recent, 65, 65
- Communication Center, 50
- communication for collaboration, 213
- Compact Central File option, 177
- complex mass families, **329–338**, 329–337
- Component icon, 545
- Component menu, 714

components  
 detail, **714**  
   adding, **714–718**, 714–718  
   arranging elements, **718–719**, 718–719  
   families, **725–733**, 726–732  
   groups, **723–724**, 724  
   linework, **725**, 725  
   Repeating Detail Component,  
**719–723**, 720–722  
   visibility, **733–734**, 733–735  
 families, **29**, 597  
   creating, **601–603**, 601  
   dimensions, **611–612**, 611–612  
   hosted vs. nonhosted, **602–603**, 602–603  
   insertion points, **603–604**, 604  
   materials, **610–611**, 610–611  
   object styles and subcategories,  
**612–613**, 612–613  
   reference points, planes, and lines,  
**605–607**, 605–607  
   type and instance parameters, **613–614**, 614  
   visibility settings, **607–609**, 608–609  
 composite views, 987–988, 988–989  
 Compound Ceiling family, 577  
 compressing animated solar studies, **356**, 356  
 computations  
   distances, 721  
   room area, **740–741**, 740–741  
 computer numerical control (CNC),  
**979–981**, 979–981  
 Concept Curtain Walls, **539–540**, 539–540  
 Conceptual Constructions dialog box,  
**360–362**, 360  
 Conceptual Design Environment (CDE), **540**  
 Conceptual Design tool  
   overview, 339  
   sustainable design  
     concepts, **339–340**  
     daylighting. *See* daylighting  
     energy modeling, **358–368**, 358, 364–368  
     schedules, **340–346**, 341–346  
     sun shading and solar paths. *See* sun and  
       solar studies  
 conceptual energy analysis (CEA) tool,  
**359–362**, 359–361

Conceptual Mass panel, 265  
 conceptual massing, **839**  
 concrete masonry units (CMUs), 112–113, 112  
 concurrent design, 382  
 conditions for stairs, **677–683**, 677–683  
 Configure UV Grid Layout command, 541  
 Configure Weather Data dialog box, 375, 376  
 conflicts in groups, 405, 405  
 consistency  
   drawing sheets, 151  
   multiple packages, 152  
 Consistent Colors view, 455, 455  
 Constrain option, 68  
 constraints  
   dimensions, **78–79**, 78–79  
   movement, 68  
   parametric projects, 829–834, 830–835  
 construction, **863**  
   builders, **873–874**  
   contractors  
     J. H. Findorff & Son case study,  
**874–880**, 875–880  
     Tocci Building Corporation case study,  
**881–886**, 881–886  
   digital markups, **868–872**, 870–871  
   film and stage, **981**, 981  
   modeling  
     assemblies, **891–892**, 892–893  
     overview, 887  
     parts, **887–891**, 888–891  
     revisions, **863–868**, 864–868  
   Construction Week setting, 384  
   constructors, class, **956**, **959–960**  
   consultants, **193**  
     coordination with. *See* coordination  
     preparation for, **193–195**, 194  
 content, **29**, 29  
   custom, **126**  
   recycled, **341–343**, 341–343  
   scheduled, 42  
 context menus, **65–66**, 65  
 Contextual Modify tabs, 59, 59

## contractors

- J. H. Findorff & Son case study, **874–880**, 875–880
- Tocci Building Corporation case study, **881–886**, 881–886

## control points, **273–277**, 273–277

## controls on user forms, **954–956**, 955

## converting

- datum level to view level, 19, 20
- lines, 729, 729
- solids to voids, 308–309, 308, 323–324, 323–324, 618, 618

## Cool White Matte finish type, 370

## coordinates

- from CAD files, **201**

## linked models

- acquiring and publishing, **201–202**, 202
- project base points and survey points, **202–205**, 202–204
- sharing, **199–200**, 201

## coordination

- Coordination Review tool, **217–220**, 217–218, 220
- Copy/Monitor tool, **214–217**, 214–215
- for importing, **234**, 234
- interference checking, **220–223**, 222–224
- linked models. *See linked data and models*
- overview, **195–198**, 195, 197
- tools overview, **213**

## Coordination Review dialog box, 218–220, 220

## Coordination Review tool, 213

- exercise, **219–220**, 220
- working with, **217–219**, 217–218

## Copy/Monitor Options dialog box, 214, 214

## Copy/Monitor tool, **197**, 213, 213

- benefits, **196**
- exercise, **216–217**
- working with, **214–215**, 214–215

## Copy New Elements option, 219

## Copy Sketch option, 219

## Copy tool, 69

## copying

- Copy/Monitor tool, **214–215**
- elements, **69**, **80–81**, 80–81
- groups, 401, 401, 403, 403
- with inserting, 139
- linked file elements, 210
- with offsets, 77
- physical machines, 922
- views, **32–33**, 33
- CopyLocal property, 954, 954
- Core shaft behavior, 507
- cores, walls, **506**, 506–507
- Corner Mullion type, 534
- corner mullions, **534–535**, 534
- cosine function, 832
- count, selection, 62
- Create A Light Meter button, 376
- Create A New Toposurface Exactly Like The Existing One option, 95
- Create Assembly option, 892
- Create Assembly Views dialog box, 892, 893
- Create By Sketching option, 92
- Create Energy Settings option, 360
- Create Filled Region Boundary tab, 131
- Create Floor Boundary option, 567
- Create Form tool for massing, 271, 271
- complex mass families, 335
- forms, 278, 841
- geometry options, 547, 548
- in-place solids, 302, 304
- pyramid curtain wall, 553, 554
- surfaces, 274, 276, 280, 280, 290, 557
- Create Group button, 400, 724, 724
- Create New template option, 100
- Create panel for views, 19
- Create Parts option, 887
- Create Property Line dialog box, 92
- Create Roof Footprint tab, 579
- Create Similar tool, **82**, 405
- Create Views option, 892
- Create Void command, 841
- Crop Region Size dialog box, 356, 357, 472, 472
- Crop Region Visible option, 34

- cropping  
 aspect ratio effect, 472, 472  
 hiding, 34, 34  
 horizontal extents, 34, 34  
 perspective views, 44, 44  
 .csv (Comma Separated Values), 644  
 Ctrl key for selections, 62  
 cubes, 266  
 culture, BIM, 11–13  
 Current View Only option, 229–230, 234  
 Curtain Grid tool, 530–531, 585  
 Curtain Panel Pattern Based option, 288, 288  
 Curtain Panel template, 670–671, 670  
 curtain panels, 288, 288  
     creating, 538  
     railings, 670  
     Singapore Polytechnic project, 901–902, 902  
     types, 527, 527  
 curtain systems  
     description, 526, 526  
     on mass faces, 849–853, 850–854  
 Curtain Wall tool, 670  
 curtain walls  
     Adaptive Component family, 559–560, 559–560  
     applications, 537–539, 538–539  
     complex, 539–540, 539–540  
     Concept Curtain Walls, 539–540, 539–540  
     corner mullions, 534–535, 534  
     creating, 538  
     designing, 528, 529  
     doors in, 533, 533  
     elements and components, 527–528, 527  
     glass material, 111  
     grids  
         customizing, 530–532, 530–532  
         description, 527, 527  
         panels, 529, 531–532  
         UV, 540–546, 541–542, 546  
     mullions, 530, 532  
     overview, 526, 526  
     pattern-based panels  
         building, 546–550, 547–550  
         loading, 550–551, 551  
 pyramid, 551–555, 551–555  
 scheduling, 560–561, 561  
 size limiting, 556–558, 557–558  
 patterns  
     applying, 543–544, 544  
     custom, 555–556, 555–556  
     surface editing, 544, 545  
 railings, 670–672, 670–671  
 surfaces  
     dividing, 540–543, 540–543  
     representing, 545–546, 545–546  
 as system family, 502  
 types, 535–537, 535–536  
 curves  
     parametric projects, 836–839, 837–838  
     railings, 684, 685  
     roof surfaces, 238–240, 238–240  
     solids overlapping on, 850  
     walls, 1009, 1009  
 custom panels, 851–852  
 custom patterns  
     curtain walls, 555–556, 555–556  
     fill, 114  
 custom templates, 134, 135  
 Cut Geometry tool  
     enveloped walls, 23, 23  
     floor edges, 572  
     floor finishes, 576  
 cut modes, 101  
 Cut Pattern setting, 109  
 cut patterns, 109  
 cut schedules, 94–95  
 cut symbols, 768  
 cut values for family categories, 599–600, 600  
 Cutoff Level option, 581, 581  
 Cutoff Offset option, 582  
 cutouts, 843–844, 844  
 cutting voids, 309, 309
- ## D
- DARCH (Diploma in Architecture)  
 program, 896  
 dashed lines for curtain walls, 527  
 data in design process, 596

- database-level applications, 947
- dates
  - film releases, 975
  - virtualization settings, 929, 929
- datum
  - analytic and graphic extents, 20–29, 21–28
  - components, 19, 19
  - in groups, 409
  - levels, 19–20, 20
- daylighting, 340, 368–369
  - analysis tools, 369
  - benefits, 369
  - exporting views to 3DS Max Design, 372–379, 372–379
  - materials, 370–371, 370–371
  - models, 370
  - sun. *See* sun and solar studies
- DaySIM tool, 369
- DDS CAD Viewer, 256
- deactivating views, 766
- deadlines for film and stage, 976
- debugging
  - sample project, 969–970
  - settings, 951, 951–952
- Default 3D View option, 373
- Default view template, 124
- Default Wrapping setting, 505
- defaults
  - boot order, 935, 935
  - camera view for solar studies, 349
  - templates, 124, 128
- Defines Origin option, 604, 604
- Defines Slope option, 579–580, 580, 585
- Delete Element option, 219
- Delete Inner Segment option, 76, 76
- deleting
  - areas, 746
  - constrained elements, 79, 79
  - design options, 415–416
  - edges, 303, 303
  - elements, 219
  - line patterns, 104
  - line styles, 106
- pinned elements, 78
- railing profiles, 660
- Delimited option, 643
- demolition phase in design exercise, 418–419, 418–419, 422–423, 422–423
- Deny/Retract permission option, 185
- Depth Clipping option, 39
- Description tag, 950
- design
  - curtain walls, 528, 529
  - exercise, 416–417, 417
  - demolition phase, 418–419, 418–419, 422–423, 422–423
  - design options, 430–432, 430–432
  - existing plan, 417–418, 417
  - proposal phase, 420–421, 420–422, 424–426, 424–426
  - scheduling, 427–430, 427–430
- film and stage
  - alternatives, 992, 993
  - interaction, 975, 975–976
- options, 411
  - creating, 411–413, 411–413
  - design exercise, 430–432, 430–432
  - editing, 413–414, 414
  - removing, 415–416, 415–416
  - viewing and scheduling, 414–415, 414
- Singapore Polytechnic projects, 901–902, 902
  - sustainable. *See* sustainable design
- design elements identification, 445–446, 446
- Design Option Set warning, 416, 416
- Design Options dialog box, 412, 412
- Design Options panel, 412–414, 412
- Design Review
  - importing markups from, 871–872, 871
  - publishing to, 869–871, 870–871
- Detach From Central functionality, 186, 206–207, 207
- Detail callouts, 40–41, 41
- Detail Component family, 714, 714, 721
- Detail Line tool, 706–708, 706, 718
- Detail panel, 705
  - Detail Line tool, 706–708, 706
  - Region tool, 708–713, 708–713

- Detail Rotation option, 721
- Detail sections, 37–38, 37–38
- details and detailing, 151, **705**
  - from CAD files, **758–760**, 759
  - components. *See* components
  - energy models, 367, 367
  - film and stage, **978**, 978
  - fixing, **736**, 736
  - groups, 401–402, 401, **723–724**, 724, **761–762**, 761–762
  - guidelines, **735–736**
  - importing, **235–236**, 235–236, **727–728**, 727–728
  - insulation, **723**, 723
  - levels. *See* level of detail
  - lines, **706–708**, 706–708, 717–718, 717–718
  - from other Revit projects, **761–764**, 761–764
  - regions, **708–713**, 708–713
  - repeating, 721–722, 721
  - Singapore Polytechnic projects, **902**, 903
  - templates, 725
  - window family, **726–733**, 726–732
- Details tab, 367, 367
- development environment options, **951–952**, 951–952
- DevTV: Introduction to Revit API Programming, 970
- DGN data
  - importing, **241–242**, 242
  - levels, 102, 229
- Diffuser Material parameter, 493
- digital markups, **868–872**, 870–871
- Dimension Text dialog box, 795, 795
- dimensions
  - adding, **794–796**, 794–796
  - complex mass families, 330, 331, 334
  - ellipses, 859, 859
  - family components, **611–612**, 611–612
  - film and stage, **978–979**
  - generic model mass families, **320–322**, 320–321
  - masses, **312–316**, 312–316
  - orthographic views, 42, 43
- panels, 859, 859
- temporary, **66–67**, 66–67
- Diploma in Architecture (DARCH) program, 896
- disabling
  - leaders, **868**
  - worksharing, **186**, 186
- Disallow Join option, 519, 520
- Discipline setting for parameters, 798
- Disjoin option, **68**
- Dissolve tool
  - in-place solids, 302, 302
  - massing surfaces, 276, 276
- Distance setting, 541
- distances
  - calculating, 721
  - curtain walls, 541
- Divide Parts button, 889
- Divide Surface tool, 542
  - pattern-based panels, 558
  - pattern-based system, 285, 285
- Divided Surface tab, 541, 544
- divided surfaces
  - curtain walls, **540–543**, 540–543
  - pattern-based panel families for, **550–551**, 551, 558
  - pattern-based system, 285, 285
- dividing toposurfaces, **89–90**, 89–90
- Do Not Synchronize And Set Reminder
  - Intervals option, 179
- Do Not Wrap option, 505, 508
- Do U Revit blog, 527
- documentation, **42**
  - as-built, 863
  - details
    - from CAD files, **758–760**, 759
    - from other Revit projects, **761–764**, 761–764
  - legends, **757–758**, 757–758
  - parametric models, **858–860**, 859–860
  - plans, **739–747**, 740–747
  - room area, **740–741**, 740–741
  - schedules, **748–757**, 749–756
  - sheet layout, **764–769**, 766–769
  - Singapore Polytechnic projects, **902**, 903

dollying cameras, 473, 473  
 dome, glazed, 526, 526  
 dome roofs, 584  
 Don't Copy This Type option, 214  
 doors  
     constrained, 78, 78  
     in curtain walls, 533, 533  
     in groups, 402, 402, 405–406, 405–406  
     rotating, 70  
     symbolic lines, 732  
     tags, 127–128, 127–128, 788–789, 788  
 dormers, 586–589, 586–589  
 Double Hung window family, 730, 730  
 DoWorksets subroutine, 957–958  
 Draft settings, 468, 468  
 drafters, 148–150  
 drafting patterns, 112–114, 113  
 drafting regions, 710–711, 711  
 drafting views, 40, 40  
 Draw panel  
     details, 707–708, 707  
     reference points, 605, 605  
 drawing area, 52, 52–53  
 drinking fountains, 857  
 driving geometry, 623–628, 623–628  
 dRofus application, 818  
 Duplicate View option, 32, 888  
 duplicating. *See* copying  
 DWF Export Settings dialog box, 869–870, 870  
 DWF files, exporting to, 869–871, 870–871  
 DWF Markups tab, 872  
 DWF Properties tab, 869  
 DWG Export Settings dialog box  
     Colors tab, 252, 252  
     DWG Properties tab, 246, 246, 248, 248  
     General tab, 253, 253  
     Layers tab, 246–247, 249, 249  
     Lines tab, 250, 250  
     Patterns tab, 250, 251  
     Solid tab, 252, 252  
     Text & Fonts tab, 250–252, 251  
     Units & Coordinates tab, 252, 252  
     View/Sheet tab, 244, 244

DWG files, exporting, 242–243  
 DWG Properties tab, 246, 246, 248, 248, 255  
 DXF files

    importing, 232–233  
     line weights, 226, 227  
     linked, 241–242

## E

early adoption, 11, 11  
 Ecotect tool, 369  
 edge-based sweeps, 626, 626  
 edges  
     blends, 323–325, 324  
     floors, 570–572, 570–572  
     in-place solids, 296–306, 296, 299–301, 303, 305  
     silhouettes, 463, 463  
     slab, 569, 570  
 Edit Assembly dialog box  
     roof layers, 592, 592  
     structural floors, 567  
 walls  
     articulation, 510–511, 511  
     layers, 508–510, 517  
     reveals, 514, 514  
     stacked, 524, 524  
     structure, 503, 503, 505  
     sweeps, 513, 513  
 Edit Baluster Placement dialog box, 649, 649, 653, 653, 656, 656, 665, 665  
 Edit Boundary button, 522  
 Edit Color Scheme dialog box, 117, 117, 811, 811  
 Edit Extrusion option, 612  
 Edit Family option, 726  
 Edit Graded Region dialog box, 95  
 Edit Group option, 402, 724  
 Edit Group panel, 724, 724  
 Edit In-Place mode, 284–285  
 Edit Label dialog box, 127, 127, 130, 793, 793, 804–805, 805  
 Edit Option mode, 413–414, 414  
 Edit Pasted mode, 80, 80

- Edit Pasted panel, 80, 80
- Edit Profile tool
  - dormers, 588
  - generic model mass families, 325, 325
  - walls, 22–23
- Edit Rails dialog box, 653, 653, 656, 657
- Edit Schedule dialog box, 94
- Edit Scheme button, 811, 811
- Edit Shared Parameters dialog box, 800–801, 801, 805
- Edit Surface tool, 89–90
- Edit Type dialog box, 567
- Edit Type tool
  - shelf parameters, 634
  - structural floors, 567
  - text, 773
  - wall parameters, 30
- Edit Walkthrough option, 477, 477
- Edit Wall Joins tool, 520
- Editable Elements dialog box, 186, 186
- editing
  - design options, 413–414, 414
  - viewport types, 822–823, 822–823
- Editing Request dialog box, 184
- Editing Request Granted dialog box, 184, 184
- Editing Request Placed dialog box, 183, 183
- Editing Request Received dialog box, 184, 184
- Editing Requests dialog box, 185, 185
- efficiency of stairs and railings, 700
- Element notes, 776, 782, 782
- Element Properties dialog box, 176, 180–181, 180
- elements
  - aligning, 74–75, 75
  - arraying, 72–74, 72–73
  - borrowing, 182–183
  - color, 117, 118
  - copying, 69, 80–81, 80–81
  - groups, excluding, 405–406, 405–406
  - locking, 77–79, 78–79
  - mirroring, 71–72, 71
  - moving. *See* moving elements
  - ownership in worksets, 181–191, 181–191
- pasting, 80–81, 80–81
- rotating, 70–71, 70–71
- scaling, 74
- selecting, 61–62, 62
- time, 383–385, 383–385
- Elements parameter, 944
- Elevation of Poche Base setting, 91
- Elevation view window, 48
- elevations
  - points, 84
  - tags, 132–134, 133–134
  - toposurfaces, 89–91
  - views, 35–36, 35
- Ellipse Void command, 841, 842
- ellipses dimensions, 859, 859
- emotive lighting effects, 975, 976
- Empty option for pattern-based system, 287, 287
- End of the Line nightclub, 1008–1010, 1008–1010
- end posts, 665, 669, 680–683, 682–683, 696
- end users, virtualization advantages for, 919
- energy modeling, 358–359, 358
  - detailed, 362–363
  - energy analysis, 359–362, 359–361
  - exporting to gbXML, 366–368, 366–368
  - settings requirements, 363–366, 364–366
- Energy Settings dialog box, 360, 360, 362
- Entourage workset, 495, 495
- envelopes in energy modeling, 363–364, 364
- EQ function, 330, 795, 795
- eQuest energy modeling application, 363
- equinox in sun exposure, 347, 347
- errors, warnings, 161–162, 161–162
- Esherick, Joseph, 925
- evolution vs. revolution, 12–13, 13
- Excel for parametric models, 860
- excluding elements within groups, 405–406, 405–406
- Execute function, 943–945, 962–963
- execution plans in BIM, 194–195
- Existing To Remain element, 397, 397

existing requirements in parametric models, 854–855, 855–856  
 exploded views, **989–990**, 989  
 exploding data, **232**, 728, 728, 760  
 Export As Polymesh option, 254  
 Export CAD Formats dialog box, 254  
 Export Complexity setting, 367, 367  
 Export gbXML - Settings dialog box, 366–368, 366–367  
 Export Layers dialog box, 246–247, 507, 507  
 Export menu, **478**  
 Export Selected Object option, 238  
 Export Settings dialog box, 244, 244, 246, 246–247  
 Export Setup option, 243  
 exporting  
     2D data, **247–253**, 247–253  
     3D data, **253–257**, 254–257  
     animated solar studies, **355–356**, 356–357  
     AVI files, 478, 478  
     daylighting views, **372–379**, 372–379  
     to DWF, **869–871**, 870–871  
     energy models, **366–368**, 366–368  
     Hidden Line view, **475–480**, 476–479  
     IFC interoperability, **255–257**, 256  
     layer settings, **246–247**, 246–247  
     overview, **242–243**  
     preparation, **243–246**, 243–245  
     railings, 663, 663  
         shared coordinates for, **200**  
 Extend Below Base setting, 668  
 Extend Into Wall (To Core) option, 579  
 extending  
     lines and walls, **75–76**, 75  
     wall layers, **517–519**, 517–519  
 Exterior behavior of walls, 507  
 exterior elevations, 36  
 exterior glazing material, 111  
 Exterior Wall Enclosure parameter, 509  
 Exterior wrap option, 505  
 external applications, **945–947**  
 external commands, **943–945**  
 external utility installation, **948–950**  
 Extrude Curve Along Curve tool, 238

Extrude Surface tool, 238  
 Extrusion End setting, 631  
 Extrusion Start setting, 631  
 extrusions, 615, 615  
     roofs by, **582–583**, 582–583  
     sketches, 490–491, 490  
     visibility, 627, 627

## F

F104 afterburner, 1003, 1004  
 fabrication, film and stage, **979–981**, 979–981  
 faces and face-based elements  
     advantages, **603**  
     complex mass families, 337, 337  
     curtain systems on, **849–853**, 850–854  
     film and stage, 994  
     imported data as, **238–240**, 238–240  
     in-place solids, 295–296, 296, 298, 299  
     wall by face mass, **281–284**, 281–284  
     wall finish, **511–512**, 512  
 families, **29**, 29  
     Adaptive Component, **559–560**, 559–560  
     categories. *See* categories  
     components. *See* components  
     generic model outline, **828–829**  
         building footprint, 829–839,  
             829–835, 837–838  
         building massing, **839–845**, 840–846  
         conceptual massing, **839**  
     imported data in, 231  
     Keynote, **787–788**, 788  
     mass, **264**, 264  
         complex, **329–338**, 329–337  
         generic model, **318–329**, 318–329  
         simple, **311–318**, 311–317  
     pattern-based panel  
         building, **546–550**, 547–550  
         loading, **550–551**, 551  
         pyramid curtain wall, **551–555**, 551–555  
         size limiting, **556–558**, 557–558  
     purging, **154–155**, 155  
     tags, **126–127**, 126  
     template selection, **598–601**, 598–600  
     worksets, 169

- Family Already Exists dialog box, 509  
 Family Category And Parameters dialog box, 804, 805  
**Family Editor**, **595**  
 components. *See* components  
 family template and category selection, **598–601**, 598–600  
 geometry  
     carving, **618–619**, 619  
     cut display, 101  
     driving, **623–628**, 623–628  
     overview, **615**, 615  
     panels, 528  
 labels, 126  
 Load Into Project option, 509  
 masses, 262, 264–265, 264, 309–310  
 offsets in, 77  
 overview, **596–597**  
 projection and cut values, **599–600**, 600  
 scaling in, 74  
 schedules, **599**, 599  
 shelf. *See* shelf  
 solid and void relationships, **616–618**, 616–618  
 tags, 126–127, 130–131, 793  
 text, 126  
**Family Element Visibility Settings** dialog box, 609, 609, 733, 733  
**Family** option for legends, 758  
**Family Types** dialog box  
     complex mass families, 329, 330, 335, 335–336  
     formulas, 636–637, 638  
     materials, 639, 640  
     shelf parameters, 633–634  
     type catalogs, 640, 642  
*Fantastic Four*  
     airlock, 973, 983, 983, 989, 990, 996–1097, 996–997  
     production, **999**, 999–1000  
*Fantastic Four: Rise of the Silver Surfer*  
     Fantasticar, 980, 980  
     lab, 982, 982  
     pagoda, 979, 979–980, 1002, 1002–1003  
 Fantasticar, 980, 980  
 Far Clip option, 39  
 Far Clip Offset option, 45, 45–46  
 fashion show in Singapore Polytechnic project, **898**, 898–899  
 FBX format, 246, 372, 373  
 female lavatories, 857  
 fields and Fields tab  
     keynote legends, 786, 786  
     parts, 891, 891  
     schedules, 94, 158, 341–342, 341, 750, 750, 753–754  
     Sheet List schedules, 756  
     window-to-wall ratio, 346  
**File Locations** tab  
     keynotes, 780  
     templates, 134, 134  
**File Save Options** dialog box, 172, 207, 207  
 file size, **154–157**, 155–157, 920  
**Files Of Type** option, 241  
**Fill Available Space** option, 721  
 fill patterns  
     creating, **113–114**, 113  
     importing, **114–116**, 116  
     overview, **111–113**, 112  
     railings, 657  
**Fill Patterns** dialog box, 111, 112, 115, 657  
 fill schedules, **94–95**  
 Filled Region tool, 709, 711  
 filled regions, 708–710, 708–710  
     boundaries, 715, 715–716  
     creating, **711–713**, 712–713  
     types, **710–711**, 711  
 fillet arcs, **830–836**, 831–835  
 film and stage, **973**  
     best practices, **992–997**, 993–997  
     construction, **981**, 981  
     design  
         alternatives, **992**, 993  
         interaction, **975**, 975–976  
         overview, **974–975**  
     details, **978**, 978  
     dimensions, **978–979**

- examples
  - Fantastic Four*, 999, 999–1000
  - Fantastic Four: Rise of the Silver Surfer*, 1002, 1002–1003
  - I, Robot*, 997–998, 998
  - Night at the Museum: Battle of the Smithsonian*, 1003, 1003–1004
  - Snakes on a Plane*, 1001, 1001–1002
  - Sucker Punch*, 1011–1015, 1011–1016
  - Tron Legacy*, 1008–1010, 1008–1010
  - Watchmen*, 1004–1007, 1005–1007
  - X-Men: The Last Stand*, 1000, 1000–1001
- exploded views, 989–990, 989
- fabrication, 979–981, 979–981
- family categories, 993–995, 994
- form/transparency, 982, 982
- geometry
  - creating, 995–997
  - flexible, 992
  - nesting, 993, 993
- lead time and production, 976–977, 976–977
- level of detail, 979, 979, 992
- lighting/shadows, 983, 983
- materials, 984, 984
- photorealistic renderings, 989
- rendering and visualization, 984–988, 984–989
- Revit to CGI workflow, 990, 991–992
- schedules, 977
- templates, 982
- worksharing, 997
- Filter By Sheet option, 786, 787
- Filter dialog box, 63, 63, 365, 365
- Filter tool, 62–63
- filters and Filter tab
  - generic host elements, 445–446, 446
  - keynote legends, 786, 787
  - keynote schedules, 160
  - matter-rendering, 984, 984
  - parameters
    - applying, 384–385, 385
    - project, 440–442, 440–443
    - user-defined, 443–445, 443–445
  - phase, 354, 354, 389, 389, 882, 984–985, 985
  - properties, 50
- room elements, 365, 365
- schedules, 342–343, 343, 751, 751
- selection, 62–63, 63, 65
- view phase, 394, 395–396
- views, 121–122, 122, 156, 156
- Filters dialog box
  - generic host elements, 446, 446
  - project parameters, 440, 440
  - user-defined parameters, 443–444, 443–444
- Final Gather setting, 376
- Fine detail level, 734, 735
- Finish Edit Mode button, 92
- finish face materials for walls, 511–512, 512
- finishes, floor, 574–576, 574–576
- firm culture in BIM, 11–13
- Fixed Distance option, 721
- Fixed Number option, 721
- Fixed Rotation option, 133
- flashing, 732, 732
- floor area faces, 264–266, 265–266
  - complex mass families, 337, 337
  - creating, 268, 268
  - generic model mass families, 326, 327
- Floor By Face tool, 568, 568
- Floor Edge option, 571
- Floor Plan callouts, 38–39, 39
- floors
  - attaching to walls, 522, 522
  - collaboration and ownership, 566
  - copying, 215
  - edges, 570–572, 570–572
  - finishes, 574–576, 574–576
  - floor by face method, 568, 568
  - joining walls to, 79, 79
  - overview, 563–564, 564–565
  - pads, 569, 569
  - reflectance settings, 371
  - shapes, 589–590, 589–590
  - sketching, 573–574, 573
  - slab edges, 569, 570
  - structural, 566–568, 566–568
  - window-to-wall ratio, 344–346, 345
- Floors Only view, 571

- folders
    - views, 119–120, 119
    - virtualization, **930–931**, 930–931
  - Folders tab, 119–120, 119
  - fonts
    - exporting, 243, 250–252, 251
    - mapping, **227–228**
    - temporary dimensions, 67
  - footcandles
    - defined, 368
    - readings, **379–380**
  - footprints
    - building, **829–839**, 829–835, 837–838
    - roofs, **578–582**, 578–582
  - foreground setting for imported data, **230**
  - Format dialog box
    - labels, 128
    - roofs, 580, 580
    - toposurfaces, 87
  - Format panel for text, 774–775, 774
  - Formatting tab
    - schedules, 159, 343, 752, 752
    - multicategory, 159, 159
    - pattern-based panels, 561
    - Rentable Area, 755
    - window-to-wall ratio, 346
  - forms
    - film and stage, **982**, 982
    - massing, **278–279**, 278–279
    - user
      - class constructors, **956**
      - controls, **954–956**, 955
      - helper subroutines, **957–959**
  - Forms tab for Sweep tool, 324, 324
  - formula-driven massing, **309–310**, 310–311
    - complex mass families, **329–338**, 329–337
    - generic model mass family, **318–329**, 318–329
      - simple mass families, **311–318**, 311–317
  - formulas
    - distance, 721
    - masses, **262**
    - schedules, 341–342
    - shelf brackets, **636–638**, 636–638
    - triangles, 832
  - Foster, Norman, 905
  - Foundation behavior, 507
  - foundations
    - modeling, 879
    - walls, 507
  - frames in exported animated solar studies, 356
  - framing elevations, 36
  - freestanding elements
    - mirroring, **72**
    - moving, 68
    - rotating, **70**
  - Full Explode option, 760
  - Full Frames (Uncompressed) option, 356
  - full-screen mode for virtualization, 934, 934
  - FullClassName tag, 949
  - Function column for walls, **504**
  - Function type property for walls, **507**, 507
  - fuselage, 1011–1012, **1011–1012**
- ## G
- gaffers, 975
  - gbXML model, 363, **366–368**, 366–368
  - General Services Administration (GSA), 748
  - General tab
    - DWG Export Settings, 253, 253
    - energy model exporting, 367
    - Lighting Analysis Assistant, 374, 374
    - local files, 175, 175
      - permissions, 191
    - Generic Model line family, 858–859
    - generic model mass families, **318–329**, 318–329
      - building footprint, **829–839**, 829–835, 837–838
      - building massing, **839–845**, 840–846
      - conceptual massing, **839**
    - Generic Models family template, 598, 598
    - geometry
      - carving, **618–619**, 619
      - Copy/Monitor tool, 196
      - driving, **623–628**, 623–628

- film and stage
  - creating, 995–997
  - flexible, 992
  - nesting, 993, 993
- floor edges, 572
- nesting, 614
  - pattern-based panels, 290, 290, 546–550, 548–550
  - phases, 381–383, 386, 386, 390–393, 391–393
  - types, 615, 615
  - visualization, 481–482, 481–482
- GFA (Gross Floor Area) parameter, 848
- Ghost Surfaces option, 54, 54, 456, 456, 482, 482
- Gibbons, Dave, 1004
- glare, 368
- glass stairs, 694–699, 695–699
- glazed dome, 526, 526
- glazed panels, 528, 533, 533
- glazing
  - creating, 111
  - and daylighting, 340
  - doors, 533, 533
  - Karnak, 977, 977
  - settings, 371, 371
- Glazing Is Shaded property, 362
- goal setting in BIM, 10–11, 10–11
- Google Maps, 437
- Google SketchUp, 237, 253–255, 254–255
- Graded Region tool, 94–95
- Gradient Background option, 352
- gradient backgrounds in sun studies, 352
- Grand Totals option, 157, 342
- Grant option for permissions, 185
- granting permissions, 184–185, 184–185
- graphic appearance for Design Review markups, 872
- Graphic Display Options dialog box, 456, 456
  - ambient lighting, 462, 462, 464, 464
  - animation paths, 476, 476
  - location, 363
  - masses, 310, 310
  - shadows, 54, 54, 457, 458, 460, 460
- solar studies, 349–352, 350, 354–355
  - sun intensity, 459, 459
- graphic extents, 20–29, 21–28
- graphic overrides for imported data, 231, 232
- Graphic Overrides tab
  - materials, 439, 439
  - phasing, 390, 390, 392, 392
- graphics cards, 920–921
- Graphics tab
  - materials, 108, 109
  - selection colors, 61
  - temporary dimensions, 67
- Gray Inactive Worksets button, 176
- Green Building Studio service, 359–360, 847, 847
- green screens, 981, 981
- grid justification markers, 542
- Grid Line option, 528
- Grid Line Segment option, 528
- Grid Pattern: Layout options, 536–537
- grid segments for curtain walls, 530–532, 530–532
- grids, 19
  - copying, 215
  - curtain systems, 850–851, 850–851
  - curtain walls
    - customizing, 530–532, 530–532
    - description, 527, 527
    - panels, 529, 531–532
    - UV, 540–546, 541–542, 546
  - guide, 766–767, 767
  - light meters, 376, 377
  - worksets for, 47, 168
- Grips tool for text, 772
- gross area, 741–742
- Gross Floor Area (GFA) parameter, 848
- Group And Associate option, 74
- Group Parameter Under tool, 799
- groups, 400
  - arrays, 74
  - best practices, 409–411, 410
  - copying, 401, 401, 403, 403
  - creating, 400–404, 400–404
  - detail, 401, 402, 723–724, 724, 761–762, 761–762

excluding elements within, **405–406**, 405–406  
 light, **486–495**, 486–495  
 from links, **407–409**, 407–409  
 modifying, **402–403**, 402–403  
 names, 406, 761, 801, 801  
 purging, **154–155**, 155  
 saving and loading, **406–407**, 406–407  
 GSA (General Services Administration), 748  
 guest computers in virtualization, **918**  
 Guide Grid command, 766  
 guide grids, **766–767**, 767  
 Gypsum Wall Board, 370

## H

half-lit effect, 486  
 hand sketching, **898–899**, 899–900  
 Handler, Laura, 873–874, 880  
 handrails. *See* railings and handrails  
 happiness vs. time in technological adoption, **11–12**, 12  
 hard disks for virtualization, **937**, 937  
 Hardin, Brad, 874  
 hardware  
   Bohlin Cywinski Jackson, **927–939**, 927–939  
   printer ports for virtualization, 938, 938  
 Hatch Pattern In Dwg menu, 250, 251  
 hatch patterns, 111  
 head/tail graphics, **131–132**, 132  
 Height setting, 356  
 Height At Tail setting, 585  
 Height Offset At Head setting, 585  
 Height Offset From Level setting, 95, 577  
 heights  
   animated solar studies, 356  
   labels, 128  
   mass families, 314–315, 314–315, **322**, 322, 325, 325  
   roof slope, 585  
   room, **364–365**, 365  
   schedules, 768, 768  
 helper subroutines  
   sample project, **966–967**  
   user forms, **957–959**

hexagon-shaped panel, 555, 555–556  
 Hidden Line view  
   composite, 987, 987–988  
   edges and faces, 453, 454  
   exporting, **475–480**, 476–479  
   filters in, 442, 443  
 Hide In View setting, 872  
 hiding  
   cropping, 34, 34  
   Design Review markups, 872  
   linked file elements, 210  
   section boxes, 254, 255  
 Higgins, John, 1004  
 Highlight In Model tool, 753  
 Homaili, Muhammad Nicco Bin, student project by, **903–904**, 904  
 Home option for ViewCube, 56  
 Home tab, 57, 57  
 horizon simulation, 462, 462  
 horizontal exiting width requirements, 857  
 hospital case study  
   construction stage, 878, 878  
   preconstruction planning, **874–877**, 875–877  
   set-out drawings, **878–880**, 878–880  
 host families  
   components, **601–603**, 602–603  
   in design process, 29, **596–597**  
 Host Length option for legends, 758  
 hosts  
   in groups, 409–410  
   in virtualization, **917**, 938, 938  
 Hui, Thio Jian, student project by, **908–909**, 908–909

## I

*I, Robot*  
   nesting geometry, 993, 993  
   production, **997–998**, 998  
   walkway, 984, 984  
 IAI (International Alliance for Interoperability), 255  
 identifying design elements, **445–446**, 446  
 Identity tab for materials, **108**, 782, 783  
 IES <VE> energy analysis tool, 363

- IExternalApplication interface, 945–947, 953, 965
- IExternalCommand interface, 943–945, 953, 962–963
- IFC (Industry Foundation Classes) data model, 255–257, 256
- IFC Engine Viewer, 256
- Ignore New Elements option, 219
- illuminance, 368
- immediate grids in curtain systems, 851
- implementability of stairs, 649
- Import CAD Formats dialog box, 727, 727
- Import CAD tool, 229, 760, 760
- Import Instance Query dialog box, 230, 230
- Import Line Weights dialog box, 226–227, 227
- Import panel, 759
- Import Units option, 229
- Imported Categories tab, 231
- imported data
  - exploding, 232
  - as faces, 238–240, 238–240
  - in families, 231
  - foreground and background, 230
  - graphic overrides, 231, 232
  - as mass, 236–237
  - as objects, 241–242, 242
  - for toposurfaces, 85–86, 86
  - visibility of layers and levels, 230–231, 230–231
- Imported Objects tab, 102, 231, 242
- importing, 226
  - 2D data, 232–236, 234–236
  - 3D data, 236–242, 238–240, 242
  - Design Review markups, 871–872, 871
  - details, 235–236, 235–236, 727–728, 727–728
  - fill patterns, 114–116, 712, 712
  - guidelines, 232, 760
  - vs. linking, 228, 759–760, 759
  - options, 228–229, 229
  - settings, 226–228, 227
  - team coordination for, 234, 234
  - views, 763–764, 764
- In Entire Project option, 63, 181
- In-Place Mass tool, 539
- in-place masses
  - creating, 264–266, 265–266
  - walls, 262–264, 263, 539
- in-place roofs, 584, 584
- in-place solids, 294–309, 294–309
- in-place surfaces, 280, 280–281
  - pattern-based system, 284–294, 285–293
  - wall by face, 281–284, 281–284
- in-place walls, 523, 523
- in-session lists, 244
- Include Elements In Linked Files option, 750
- Indiana University, 196–197, 221
- Indirect Illumination tab, 376, 377
- Individual Owners tab, 188, 189
- Industry Foundation Classes (IFC) data model, 255–257, 256
- infill, wall types as, 528
- InfoCenter, 50, 50
- initialization functions for user forms, 956
- InitializeComponent function, 956
- innovation vs. predictability, 11–12, 12
- Insert 2D Elements dialog box, 139, 139
- Insert 2D Elements From File option, 138–139, 138, 762, 762
- Insert From File option, 764–765, 764
- Insert Views dialog box, 138, 138, 764, 764
- Insert Views From File option, 137–138, 763
- inserting and Insert tab, 57, 57
  - annotations, 125
  - Design Review markups, 871
  - duplicating with, 139
  - group links, 406, 406
  - groups, 762, 762
  - imported data, 226, 229, 237
  - linked data, 210, 235, 759
  - portability setting, 205
  - property lines, 93
  - tags, 789–790, 789
  - toposurfaces, 85
  - views, 137–138, 138, 763–764, 764
- insertion points
  - family components, 603–604, 604
  - groups, 404, 404
  - stairs, 672

- inserts for stacked walls, 525, 525  
 Inside option for repeating detail, 721  
 instance parameters  
     family components, **613–614**, 614  
     overview, **30**, 30  
     purpose, 799  
     railings, 667  
     roofs, 581, 581  
 insulation, **723**, 723  
 Insulation tool, 723, 723  
 “Integrated Project Delivery: A Guide”, 195  
 integrated project delivery (IPD) environment  
     contractors, 874  
     overview, **194–195**  
     Tocci Building Corporation case  
         study, **882–884**  
 intelligent bonds, 196  
 interface. *See* user interface  
 Interference Check dialog box, 223, 223  
 Interference Check tool, **196–197**, 222  
 interference checking, **220**  
     architect link, 198  
     exercise, **222–223**, 223–224  
     purpose, 196–197  
     tools, **222**  
 Interference References button, 888  
 Interference Report window, 223, 224  
 Interior behavior of walls, 507  
 interior elevations, 36  
 interior illumination. *See* daylighting  
 Interior wrap option for walls, 505  
 intermediate adoption, **11**, 11  
 International Alliance for Interoperability (IAI), 255  
 interoperability, **225**  
     BIM curve, **225**, 226  
     exporting. *See* exporting  
     importing. *See* importing  
 Intersecting Named References dialog box, 888, 888  
 intersections for in-place solids, 296–297  
 intersects, dividing surfaces with, **542–543**, 543  
 Intersects List option, 543  
 intervals, saving at, **178–179**, 178  
 intuitive massing, **262**, **279–280**, 280  
     in-place solids, **294–309**, 294–309  
     in-place surfaces, **280**, 280–281  
     pattern-based system, **284–294**, **285–293**  
     wall by face, **281–284**, 281–284  
 investment in BIM, **13–14**  
 <Invisible> lines, 708–709, 725  
 IPD (integrated project delivery) environment  
     contractors, 874  
     overview, **194–195**  
     Tocci Building Corporation case  
         study, **882–884**  
 ironCAD tool, 974  
 Issued setting, revisions, **865**  
 IT virtualization advantages, **918–919**  
 Itemize Every Instance option, 157, 752, 756
- J**
- J. H. Findorff & Son case study, 874  
     construction stage, **878**, 878  
     preconstruction planning, **874–877**, 875–877  
     set-out drawings, **878–880**, 878–880  
 Japanese temple set, 1013, 1013  
 Join Condition options, **536**  
 Join Geometry tool  
     floor finishes, 576  
     forms, 620  
     poches, 466  
     working with, **79**, 79  
 Join/Unjoin Roof tool, 587  
 joins  
     handrails, **662–666**, 663–666  
     phasing, 383–384, 383–384  
     walls  
         editing, **519–521**, 519–521  
         to floors and roofs, **79**, 79  
         limitations, 210  
         links vs. groups, 408, 408  
 Joint Gap distance setting, 76

**K**

## Karnak set

- detail, 977, 977, 990, 991
- green screens, 981, 981
- main hall, 990, 991–992
- production, **1004–1005**, 1005–1007

## Keep Readable option

- elevation tags, 133
- filled regions, 713
- patterns, 113

## Key Frame Editor, 477, 477

key frames, **477–478**, 477key schedules, **750**, 854, 855

## Key Value field, 786

keyboard shortcuts, **82**, 82

## Keyboard Shortcuts dialog box, 82, 82

## Keynote command, 772, 772

## Keynote Legend button, 786, 786

## Keynote Legend Properties dialog box, 786, 786

## Keynote Text field, 786

## Keynote tool, 160, 776

## keynotes, 772

- behavior and editing, **777–778**, 777
- family, **787–788**, 788
- files, **778–779**, 778–779
- legends, 40, 41, 757, **785–787**, 786–787
- loading, **781**
- managing, 778
- overview, **775–777**, 776
- schedules, **160–161**, 160–161, **787**
- settings, **780–781**, 780
- types, **781–785**, 781–785

## Keynotes dialog box, 779, 779, 781, 781, 783, 783

## Keynoting Settings dialog box, 780–781, 780

## Kosinski, Joseph, 1015

## Kron, Zachary, 294, 860

**L**

## L Corner Mullion type, 534

## labels

- adding, 793, 793, 797
- doors, **127–128**, 127–128

shared parameters, 804–806, 805–806  
vs. text, **126–127**, 126

lampposts, 660, 660–661

landings for glass stairs, 695

LanguageType tag, 950

large CAD data linking, **233**

large teams, working in, **151–153**, 152–153

LargeImage tag, 950

late adoption, **10**, 10

lavatories, 857

Lawrence Berkeley National Laboratory (LBNL), 363

Layer Modifiers option, 249

layers

color, 227, 246, 247

export settings, **246–247**, 246–247

exporting, 249, 249

importing, 229, 727, 727

names, 246, 247

visibility, **230–231**, 230–231

walls, 505, 507, 507

extending, **517–519**, 517–519

Layers table, **503–504**, 504

merging, 512, 512

wrapping, 505, 505, **508–510**, 508–510

Layers tab, 249, 249

Layers table, **503–504**, 504

laying out sheets, **764–769**, 766–769

Layout settings for repeating detail, **721**

LBNL (Lawrence Berkeley National

Laboratory), 363

lead time in film and stage, **976–977**, 976–977

Leader option

property lines, 93

revision clouds, 868

Leader Location option, 774, 774

Leader Tick Mark setting, 796

Leader Type setting, 796

leaders

dimensions, 796, 796

property lines, 93

revision clouds, 868

tags, **790**

text, 774, 774

Leadership in Energy and Environmental Design (LEED) certification, 341  
 Legend Components settings, 758, 758  
 Legend tool, 757  
 legends, 748  
     color fill  
         overview, 809–810, 809–810  
         rooms, 810–817, 811–812, 814–818  
     creating, 757–758, 757–758  
     keynote, 40, 41, 757, 785–787, 786–787  
     types, 40, 40–41  
     walls, 758–759, 758–759, 769, 769  
 Length/Format dialog box, 355–356, 356, 449, 449, 478, 478  
 Length parameter for brackets, 636, 638  
 lenses, 491–494, 491–493  
 level of detail  
     CGI work, 990  
     film and stage, 979, 979, 992  
     stairs, 678  
     visual styles, 451–453, 451–452  
 levels, 19  
     3D exports by, 257, 257  
     copying, 215  
     creating and duplicating, 19–20, 20  
     floor area faces, 267–268, 267–268  
     generic model mass families, 326, 327  
     visibility, 230–231, 230–231  
     worksets for, 47  
 levels of development (LODs), 501  
 libraries for views, 764, 764  
 lift drawings for masonry, 880  
 Light, David, 561  
 light meters, 376–378, 377  
 lighting  
     ambient, 462–464, 462–464  
     ceiling, 485–486, 485  
     daylighting. *See* daylighting  
     film and stage, 975, 976, 983, 983, 994  
     light groups, 486–495, 486–495  
     *Tron Legacy*, 1009, 1009  
 Lighting Analysis Assistant, 373–379, 374–375, 377  
 Lighting Analysis menu, 373, 374

Lighting category for film and stage, 994  
 Lighting Fixtures categories, 490, 490  
 Lighting option for sun, 349, 449  
 Lighting tab, 374–376, 375  
 limits, joins, 210  
 Line Color settings, 102  
 Line Pattern Properties dialog box, 104–105, 104–105  
 Line Pattern settings, 102  
 Line Patterns dialog box, 103–104, 103  
 Line Style panel, 706–707, 706  
 Line Styles dialog box, 105–106, 105, 707, 707  
 line weights  
     importing, 226–227, 227  
     setting, 102–103, 103, 600, 600  
 Line Weights dialog box, 103, 103, 600, 600  
 linear arrays, 72  
 linear design, 382  
 lines  
     converting, 729, 729  
     details, 717–718, 717–718  
     exporting, 250, 250  
     offsetting, 77, 77  
     patterns, 103–105, 103–105  
     property, 92–94, 92–94  
     reference. *See* reference lines  
     removing, 725  
     splitting, 76–77, 76  
     styles  
         changing, 729, 729  
         selecting, 706–707, 706–707, 725  
         setting, 105–106, 105  
         symbolic, 732, 732  
         trimming and extending, 75–76, 75  
 Lines tab, 250, 250  
 linework details, 725, 725  
 Linework tool, 105, 725, 725  
 Link CAD Formats dialog box, 233, 235  
 Link CAD tool, 229, 759, 759  
 Link Markup Pages to Revit Sheets dialog box, 871, 871  
 Link panel, 759  
 Link Revit option, 406, 406

linked data and models, 195–198, 195, 197  
 attachment vs. overlay, 205–206, 206  
 benefits and limitations, 210  
 CAD toposurfaces, 85–87, 86  
 coordinate acquisition and publishing,  
   201–202, 202  
 exercise, 210–211  
 exploding, 232  
 foreground and background, 230  
 graphic overrides, 231, 232  
 groups from, 407–409, 407–409  
 overview, 198, 199  
 project base points and survey points,  
   202–205, 202–204  
 shared positioning, 199–200, 201  
 visibility in, 211–212, 211–212,  
   230–231, 230–231  
 with worksharing, 206–209, 207–208

linking  
 Design Review markups, 871, 871  
 vs. importing, 228, 759–760, 759  
 large CAD data, 233  
 options, 228–229, 229

Linking Worksets dialog box, 209

lists  
 in-session, 244  
 text, 775, 775

live models, revisions in, 865

Load As Group option, 406

Load Family dialog box  
 property lines, 93  
 section types, 131

Load From Library panel, 533

Load Into Project option, 509, 730, 730

Load Into Projects button, 131, 550

Load Lighting Analysis Render Preset  
 option, 374

Load Weather Data button, 375

Loaded Tags tool, 125

loading  
 groups, 406–407, 407  
 keynotes, 781  
 pattern-based panel families, 550–551, 551  
 tags, 790, 790

team member work, 179, 179  
 weather data, 375, 376

local copies, worksharing, 165

local files  
 benefits, 171  
 creating, 173–176, 174–176

Local Weather And Site dialog box, 360, 360

location setting, 363

Location Weather and Site dialog box, 202,  
   202, 350, 351

Lock/Unlock 3D View button, 821

locking  
 elements, 77–79, 78–79  
 views, 470–471, 470

LODs (levels of development), 501

lonely BIM, 193, 880

LongDescription tag, 950

look-ahead projections, 881

louvers, 539, 539

Lowe, Josh, 873–874

Lu, Cheung Hon, student project by, 911, 911

luminance, 368

## M

Mac OS X, 916

macros in VSTA, 948

maglev, 1014–1015, 1014–1016

Main Pattern section for balusters, 654

Make Elements Editable option, 181

Make Plan View option, 19

Make Primary button, 416, 416

Make Surface From Closed Loops option,  
   311, 311

Make This A Central File After Save option,  
   173, 207

Make Workset Editable option, 169

male water closets, 857

Manage Links dialog box  
 Coordination Review tool, 217, 219  
 Design Review markups, 872  
 imported data, 228, 237  
 reference types, 205, 206  
 worksets, 209

Manage Project panel, 187

Manage tab, **58–59**, 58

- coordinates, 201–202

- design options, 412

- Design Review markups, 872

- fill patterns, 115

- imported data, 242

- line patterns, 104

- line styles, 105–106, 707

- location, 363

- materials, 107, 370

- object styles, 100, 231

- Purge Unused tool, 154

- revisions, 863

- section types, 131

- shared parameters, 800–801

- templates, 136

- True North, **351**

- views, 119–120, 129

- warnings, 161

management, **47–48**, 47

Manna, Robert, 135, 860

mapping fonts, **227–228**

markups, digital, **868–872**, 870–871

Martin, Teresa, 199–200

masking regions and Masking Region tool details, 708–709, 715–717, 716, **729–731**, 729–731

- labels, 128

masonry lift drawings, 880

mass faces, curtain systems on,

- 849–853**, 850–854

mass families, **264**, 264

- complex, **329–338**, 329–337

- generic model, **318–329**, 318–329

- simple, **311–318**, 311–317

mass floors

- calculations, 237

- scheduled, 42, 269, 269, **849**, 849

- selecting, 268

- window-to-wall ratio, 344–346, 345–346

Mass Floors button, 268, 345

Mass Floors dialog box, 345, 345

Mass option for solar studies, 349

mass schedules, **848–849**, 848

masses

- building, **839–845**, 840–846

- conceptual, **839**

- creating, **262**, **266–267**, 266–267, **271–272**, 271–272

- family component, **264**, 264

- floor area faces, **264–268**, 266–268

- forms, **278–279**, 278–279

- formula-driven, **309–310**, 310–311

- complex mass families, **329–338**, 329–337

- generic model mass family, **318–329**, 318–329

- simple mass families, **311–318**, 311–317

- imported data as, **236–237**

- in-place, **262–266**, 263, 265–266

- intuitive. *See* intuitive massing

- overview, 261–262

- scheduling, 42, **264–266**, 265–266, **269–270**, 269–270

- surfaces, **273–277**, 273–277

Massing & Site tab

- building pads, 91

- imported data, 237, 239

- in-place massing, 265, 265

- pattern-based panel scheduling, 560

- property lines, 92

- schedules, 95

- tools, 58, 58

- toposurfaces, 84–87

- window-to-wall ratio, 344

massing studies in Singapore Polytechnic project, **900–901**, 900

Massing toolset, 900

master keynote files, **778**

master schedule component families, 42

Match Type Properties tool

- ceilings, 577

- floors, 563

- working with, **65**

matching properties, **65**

Material Keynote tool, 783, 783

- Material Takeoff Properties dialog box, 341–343, 341, 343
- Material Takeoff schedules, 41
  - description, 748–749
  - floor finishes, 574
  - recycled content, 341, 341
- materials and Materials dialog box, 107, 107–108
  - daylighting, 370–371, 370–371
  - family components, 610–611, 610–611
  - filled regions, 713
  - film and stage, 984, 984
  - geometry phase, 392, 392
  - keynotes, 777, 783–785, 783–785
  - lenses, 493–494, 494
  - Lighting Analysis Assistant, 374, 374
  - monochromatic views, 438–439, 438
  - properties, 108–110, 109–110
  - railings, 656, 657
  - shelf, 640–641, 640–641
  - strategies, 111
  - tags, 792, 792
  - toposurfaces, 88
  - visualization, 496, 496
  - walls, 504–505, 504
  - walls finish face, 511–512, 512
- Materials Editor, 107, 108
- Materials tab, 374, 374
- MathWorld site, 861
- matte material, 439
- matter-rendering filters, 984, 984
- Maximum Distance setting for curtain walls, 541
- Maximum Spacing setting for repeating detail, 721
- Maya for film and stage, 990
- McDowell, Alex, 1004, 1015
- Medium detail level, 734, 735
- memory for virtualization, 917, 920, 927, 927
- menus, context, 65–66, 65
- Merge region tool, 512
- merging wall layers, 512, 512
- Message parameter, 943
- metadata, 684
- MicroStation, 925
- Minimum Bracket Space parameter, 636–637, 636
- Minimum Distance setting, 541
- Mirror tool, 71
- Mirror - Draw Axis tool, 71
- Mirror - Pick Axis tool, 71
- mirroring
  - elements, 71–72, 71
  - groups, 410–411
  - stairs, 667, 667
- Mission Impossible*, 1015
- Model By Face panel, 239
- Model Categories tab
  - linked files, 212, 212
  - points, 202
- Model In-Place tool, 27, 27, 523
- model lines, 271–272, 271–272
- Model Objects tab, 101, 101
- model patterns, 109, 112–113
- Model tab for solar studies, 349
- modelers, 148
- models and modeling
  - energy, 358–359, 358–361
    - energy analysis, 359–362, 359–361
    - exporting to gbXML, 366–368, 366–368
    - settings requirements, 363–366, 364–366
  - foundations, 879
  - groups, 401, 402
  - linked. *See* linked data and models
  - regions, 711, 711
- Modify Camera tab, 472
- Modify option for Coordination Review, 219
- Modify panel for details, 708, 708
- Modify Returns button, 516
- Modify Sub Elements tool, 590–591
- Modify tab, 59, 59
  - alignment, 74
  - floor edges, 572
  - floor finishes, 575–576
  - Match Type Properties tool, 65
  - object subcategories, 493, 493
  - Paint tool, 496, 496
  - tool changes, 61, 62
  - wall joins, 520

Modify tools  
 behavior, 67  
 Create Similar tool, 82  
 Modify Vertical Structure settings, 505  
 monochromatic views, 437–440, 438–440  
 monorails as railings, 660–661, 661  
 Moore, Alan, 1004  
 Move option, 219  
 Move To 2nd option, 72–73, 72  
 Move To Last option, 72–73, 73  
 Move To Start Up Location option, 200  
 Move tool, 68, 68  
   text, 772–773  
   wall layers, 518, 519  
 Moves With Nearby Elements option, 68–69,  
   69, 603, 603  
 moving elements, 66  
   Move tool, 68, 68  
   nearby, 68–69, 69  
   nudging, 68  
   point, 330, 330  
   temporary dimensions, 66–67, 66–67  
   between worksets, 179–181, 180  
 Mullion tool, 532, 585  
 mullions  
   corner, 534–535, 534  
   curtain walls, 528, 530, 532, 532, 537  
   profiles, 851  
   roofs, 585  
 Multi-Category schedules, 42, 749  
 Multi-Category tags, 792–794, 793  
 Multi-Day option, 349, 355, 449  
 multicategory schedules, 158–159, 158–159  
 multiplatform work. *See* interoperability  
 Multiple Alignment option, 74  
 multiple details, saving, 762–764, 763–764  
 Multiple Elements tool, 75  
 Multiple option  
   copying elements, 69  
   Move tool, 68  
 multiprocessors for virtualization, 917  
 Multiselect tab for groups, 402  
 My Adaptive Panel type, 560

**N**  
 Name dialog box, 132  
 Name tag, 949  
 names  
   assemblies, 892, 892  
   central files, 173  
   conventions, 153  
   energy analyses, 361, 361  
   groups, 406, 761, 801, 801  
   layers, 246, 247  
   masses, 266, 326, 326  
   parameters, 799  
   regions, 709  
   schedules, 341  
   schemes, 812  
   section tags, 132  
   standards, 247  
 namespace references, 953, 953  
 National CAD Standard, 247  
 National Institute of Building Sciences, 3  
 natural light. *See* daylighting  
 Navigation bar, 57, 57  
 Navigation Wheel, 57, 473, 473  
 Navisworks Manage tool, 222  
 nearby elements, moving with, 68–69, 69  
 Nemetschek IFC Viewer, 256  
 nested components for film and stage, 994  
 nesting  
   geometry  
     benefits, 614  
     film and stage, 993, 993  
   groups, 409  
   railing elements, 659–661, 660  
   shelf brackets, 631–633, 631–632  
 .NET Framework, 942  
 New Area Plan dialog box, 742–743, 743  
 New Assembly dialog box, 892, 892  
 New Construction phase, 390, 394, 394  
 New Drafting View dialog box, 235, 235  
 New Family - Select Template File dialog box,  
   29, 29, 804, 804  
 New Legend View dialog box, 757, 757  
 New Material Takeoff dialog box, 341

New Pattern dialog box, 113, 115–116, 712, 712  
 New Plan dialog box, 19–20, 20  
 New Project dialog box, 100, 100, 953, 953  
 New Schedule dialog box, 42, 42, 749, 749  
     categories, 599, 599  
     masses, 269, 269  
     pattern-based panel scheduling, 561  
 New Sheet dialog box, 756–757, 756  
 New subroutine, 960  
*Night at the Museum: Battle of the Smithsonian*,  
     1003, 1003–1004  
 nonhosted family components,  
     **602–603**, 602–603  
 north exposures, 343–344  
 nosing profiles for stairs, 672–673, 672–673  
 nosing structures for stairs, 654  
 Note Block schedules, 41, 749  
 notifications of permissions, 184, 184  
 nudging elements, 68  
 numbered lists, 775  
 numbering  
     keynotes, 781  
     revisions, **865–866**, 865  
 Numbering Method settings, 781  
 numerical ranges for color schemes,  
     **816–817**, 817–818  
 nurse’s station, 1012, 1012

## O

object styles and Object Styles dialog box,  
     **100**, 101  
     annotation objects, 102  
     cut properties, 599, 600  
     family components, **612–613**, 612–613  
     imported data, 102, 231, 232  
     line styles, 106  
     model objects, **101–102**, 101  
     reference lines, 272, 272  
     revision clouds, 866  
     subcategories, 493, 493  
 Object Styles setting, 59  
 objects, imported data as, **241–242**, 242  
*Oblivion*, 1015

occupancy keys, 854, 855  
 occupancy schedules, **856**, 856  
 Offset tool, 77, 77  
 offsets  
     cameras, 45, 45–46  
     lines and walls, 77, 77  
 One Baluster Per Tread option, 682  
 onion-shaped roofs, 584, 584  
 onShutdown function, 945–947, **965–966**  
 onStartup function, 945–947, **965–966**  
 Open dialog box  
     central files, 206, 207  
     elevation tags, 132  
     groups, 762, 762  
     section tags, 130  
 opening linked models, 210  
 optimizing performance  
     resolution settings, **469**, 470  
     virtualization, 928, 928, 937, 937  
 Options Bar, **59**, 59  
 Options dialog box  
     keynotes, 780  
     local files, 175, 175  
     permissions, 191  
     selection colors, 61  
     templates, 134, 134  
     temporary dimensions, 67  
     ViewCube, 56, 56  
 Options menu for ViewCube, 56  
 Orb Void Model Lines family, 844, 845  
 Orbital Scale setting, 375  
 organizing views, **119–121**, 119–121  
 Orient In Host Layers option, 113  
 Orient To View option, 113, 713, 819–820  
 orientation  
     3D views, **819–820**, 819–820  
     building, 340  
     fill patterns, 113  
     filled regions, 713, 713  
     tags, 789  
     True North, **351**  
 Orientation In Host Layers option, 713, 713  
 Origin To Origin option, 229, 233

origins  
 project, 200, 203, 205  
 world coordinates, 229, 233

orthographic views  
 vs. perspective, 470, 470  
 working in, 42–46, 44–46

Output Settings screen, 468, 468

Overhang parameter for roofs, 579, 579

Overhanging option, 287–288, 288

overlapping point elements, 330, 331

overlapping sketches, 666

overlapping solids on curves, 850

overlapping walls, 22, 23

Overlay option for linked models, 206

overriding phase filters, 984, 985

Overwrite The Existing Version option, 509

ownership  
 floors, 566  
 local files, 174, 174  
 workset elements, 181–191, 181–191

Ownership Status tab, 188, 189

## P

P2V (physical-to-virtual) technology, 922–923

pads  
 building, 90–91, 91  
 floors, 569, 569

Paint Bucket tool, 255

paint for daylighting material, 370

Paint tool, 80, 496, 496, 575

Pan control, 57

panels  
 balusters, 651, 651  
 curtain, 527, 527, 538  
 curtain walls, 530, 532  
 dimensions, 859, 859  
 pattern-based. *See* pattern-based panels  
 Ribbon, 59, 59

parallel control of in-place solids, 297, 297

Parallels products  
 Transporter, 922  
 updates, 926  
 virtualization, 916, 921–923, 921, 925–927

Workstation Extreme, 920–921

parameterization  
 arrays, 634–636, 634–635  
 dimensions, 612, 678  
 forms, 272, 614  
 reference lines, 606–607, 606–607  
 reference planes, 623, 623, 629, 629, 631–632, 631, 633

parameters and Parameter Properties dialog box  
 analytic visualization  
 project, 440–442, 440–443  
 user-defined, 443–445, 443–445

annotations  
 project, 797–800, 797–800  
 shared, 800–807, 801–807

Copy/Monitor tool, 214–215, 215

family categories, 601

family components, 613–614, 614

filters, 384–385, 384

mass dimensions, 312–316, 312–316, 320–322, 321–323

shelf brackets, 633–634, 633–634

type and instance, 30, 30–31

views, 120, 120

walls, 509

parametric models and projects, 827–828, 827–828

area analysis, 848–849, 848–849

building footprint, 829–839, 829–835, 837–838

building massing, 839

calculations, 854–858, 855–857

conceptual massing, 839

curtain systems on mass faces, 849–853, 850–854

documentation, 858–860, 859–860

generic model outline families, 828–829

resources for, 860–861

sustainability analysis, 846–847, 847

terminology, 828, 828

Partial option for pattern-based system, 287, 287

Partial Explode option, 760

- parts
  - creating, 887–888
  - modifying, 888–890, 888–890
  - scheduling, 890–891, 891
- Paste Aligned control, 80–81, 81
- pasting, 80–81, 80–81, 210
- PAT files, 114–115
- Path Type settings, 780–781
- paths
  - animation, 473–480, 473–479
  - keynotes, 780–781
  - railings, 688, 688
  - solar, 357, 357–358, 446–449, 447–449
  - sweeps, 626
- paths for linked models, 209
- pattern-based components, 326, 328
- pattern-based panels
  - building, 546–550, 547–550
  - creating, 284–294, 285–293
  - loading, 550–551, 551
  - pyramid curtain wall, 551–555, 551–555
  - scheduling, 560–561, 561
  - size limiting, 556–558, 557–558
- Pattern Type settings, 111
- patterns
  - curtain walls
    - applying, 543–544, 544
    - custom, 555–556, 555–556
    - surface editing, 544, 545
  - exporting, 250, 251
  - faces of masses, 337, 337
  - fill
    - creating, 113–114, 113
    - importing, 114–116, 116
    - overview, 111–113, 112
  - filled regions, 712–713, 712–713
  - line, 103–105, 103–105
    - surface and cut, 109
- Patterns tab, 243, 250, 251
- PBPs (Project Base Points), 202–205, 202–204
- Perez All Weather option, 376, 376
- performance
  - resolution settings, 469, 470
  - virtualization, 928, 928, 937, 937
- permissions
  - central files, 173, 173
  - granting, 184–185, 184–185
  - notifications, 184, 184
  - relinquishing, 185, 185
  - requesting, 183–184, 183–184
  - workarounds, 191
  - workset elements, 181
- perpendicular control for in-place solids, 297, 297
- Perspective View Control bar, 450
- perspective views
  - generic model mass families, 328, 328
  - in-place solids, 306, 307
  - vs. orthographic, 470, 470
  - overview, 43, 44–47
  - walls, 26, 26
- Phase-Exist material, 392, 392
- Phase Filters tab, 389, 389, 398, 398, 439, 439
- phasing and Phasing dialog box
  - associating, 381–383
  - elements associated with, 386, 386–387
  - filters, 354, 354, 387–390, 389, 882, 984–985, 985
  - geometry, 390–393, 391–393
  - materials, 985, 986
  - settings, 387–390, 387–390
  - time elements, 383–385, 383–385
  - views, 381–383, 386, 387, 394–400, 394–399
- photorealistic visualization, 450
  - ambient lighting, 462–464, 462–464
  - animation paths, 473–480, 473–479
  - film rendering, 989
  - rendering settings, 467–470, 467–470
  - section boxes, 464–466, 464–466
  - still image cameras, 471–473, 471–473
  - views, 470–471, 470
  - visual styles, 450
    - level of detail, 451–453, 451–452
    - shadows, 457–462, 457–462
    - types, 453–457, 453–457
- physical location setting, 363
- physical-to-virtual (P2V) technology, 922–923

- Pick Path tool
  - floor edges, 571
  - generic model mass families, 324, 324
- Pick Primary Host tool, 525–526, 526
- Pick Supports tool, 590
- Pick Walls tool
  - ceilings, 577
  - roofs, 579
  - sketch-based objects, 506, 506, 573, 573
  - structural floors, 567, 567
- Pin tool, 77
- pinned panels, 538
- pinning elements, 77–78, 78
- pins as balusters, 696, 696
- Place At import option, 229
- Place Detail Component tab, 714
- Place Detail Group button, 724, 724
- Place Point tool, 84
- Place Request option, 183
- placeholders for sheets, 756
- Plan/RCP option, 608
- plan views, 32–34, 32–34, 48
- planes, reference
  - family components, 605, 605
  - handrails, 651, 651
  - parameterized, 623, 623, 629, 629, 631–632, 631, 633
  - relationships, 24–27, 25–28
- planning
  - for BIM, 4–5, 4
  - J. H. Findorff & Son case study, 874–877, 875–877
- plans
  - documenting, 739–747, 740–747
  - execution, 194–195
- plumb cuts for roofs, 582
- plumbing
  - parametric model requirements, 854, 855, 857, 857
  - wall-hosted fixtures, 602, 602
- poches
  - settings, 464–466, 464–466
  - for toposurfaces, 91, 91
- Point Element tool, 548
- point elements
  - complex mass families, 331–334, 331–333
  - pattern-based panel families, 548
- points
  - adaptive, 546–548
  - insertion
    - family components, 603–604, 604
    - groups, 404, 404
    - stairs, 672
  - PBPs and survey, 202–205, 202–204
  - reference, 605, 605
  - toposurfaces, 84–87, 85
- portability setting, 205
- ports for virtualization, 938, 938
- positioning with importing, 229
- Postpone option for Coordination Review, 218
- posts
  - balusters, 651, 651, 654
  - glass stairs, 696–697
  - start and end, 665, 669, 680–683, 682–683, 696–697
- Posts section for balusters, 654
- preconstruction planning, 874–877, 875–877
- predefined material keynotes, 783, 783
- predictability
  - vs. innovation, 11–12, 12
- stairs and railings, 700
- presentation, 809
  - 3D views, 31, 819
  - annotating, 821, 821
  - orienting, 819–820, 819–820
- color fill legends
  - overview, 809–810, 809–810
  - program verification with, 818, 818
  - rooms, 810–817, 811–812, 814–818
  - viewport types, 822–823, 822–823
- Preview Solar Study option, 355, 355
- Preview window, 503
- previewing
  - fill patterns, 116
  - roofs, 592
  - solar studies, 355, 355
  - walls, 503

- previous selection, 62
- Print Setup button, 869
- Print Setup dialog box, 34, 34
- printers and printing
  - cropping visibility, 34, 34
  - ports for virtualization, 938, 938
  - resolutions, 469, 469
- priorities for wall joins, 504, 504–505
- private variables, 956, 959–960
- production for film and stage, 976–977, 976–977
- profiles
  - balusters, 653, 653
  - edges, 325, 325
  - generic model mass families, 325, 325
  - in-place solids, 302, 302–303, 305, 306
  - massing surfaces, 275, 275
  - mullion, 851
  - railings, 650, 650, 660, 674–675, 674–675
  - stringers, 674–676, 674–676
  - sweep, 571–572, 571–572
  - virtualization, 930, 930
  - walls, 22–23, 22, 521–522, 521–522
- program verification with color fills, 818, 818
- Progressbar controls, 955
- Project Base Points (PBPs), 202–205, 202–204
- Project Browser, 33, 51, 51, 118–119
- project environment for curtain walls, 539
- Project Parameters dialog box
  - labels, 797, 797
  - shared parameters, 802–803, 802–803, 805, 806
  - views, 120
- Project Phase tab, 387–388, 387–388
- Project Properties dialog box, 951, 951
- project settings
  - color schemes, 116–118, 117–118
  - fill patterns
    - creating, 113–114, 113
    - importing, 114–116, 116
    - overview, 111–113, 112
  - lines, 102–106, 103–105
  - materials, 107–111, 107–110
- object styles, 100–102, 101
- phasing to, 381–383
- Project Standards worksets, 169
- Project Template option, 100
- projection modes, 101
- projection values for family categories, 599–600, 600
- projects
  - internal coordinate system, 199–200
- organization, 17–18, 18
  - content, 29, 29
  - datum, 19–29, 19–28
  - management, 47–48, 47
  - type and instance parameters, 30, 30–31
  - views. *See* views and View tab
- parameters
  - analytic visualization, 440–442, 440–443
  - annotations, 797–800, 797–800
- parametric. *See* parametric models and projects
- roles, 147–150, 149
- settings. *See* project settings
- templates. *See* templates
- properties and Properties Palette, 50, 50
  - class, 960–962
  - complex mass families, 332, 333, 336
  - matching, 65
  - materials, 108–110, 109–110
  - overview, 64, 64–65
  - panels, 288–289, 289
  - revision clouds, 867, 867
  - room height, 364–365, 365
  - toposurfaces, 88
  - view phase, 395–396, 395–396
- Properties tab, 50, 50, 289, 289
- Property Line tab, 92
- property lines, 92–94, 92–94
- Property Lines dialog box, 92, 92
- proportional control of mass families, 314, 314, 316, 317
- proposal phase in design exercise, 420–421, 420–422, 424–426, 424–426
- Proposed element, 397, 397
- Proposed Temporary element, 397, 397

public class properties, **960–962**  
 Publish Coordinates command, 201–202  
 Publish option, 48  
 publishing  
   coordinates, **201–202**, 202  
   to Design Review, **869–871**, 870–871  
   RFA files, 48  
 pulling  
   coordinates, 201  
   edges, 300, 300  
 Purge Unused command, 154  
 Purge Unused dialog box, 154–155, 155  
 purging unused families and groups,  
**154–155**, 155  
 Push/Pull tool, 255  
 pushing  
   coordinates, 201  
   faces and edges, 298, 299–300  
 pyramid curtain wall pattern-based families,  
**551–555**, 551–555  
 pyramids, 266–267, 267

## Q

Qi, Lim Wei, student project by, **905**, 905  
 QI, Tay QI, student project by, **909–910**, 910  
 Quad Corner Mullion type, 534  
 quality control, 154  
   file size, **154–157**, 155–157  
   schedules, **158–161**, 158–161  
   warnings, **161–162**, 161–162  
 quality settings, **467–470**, 467–470  
 Quick Access toolbar (QAT), **49**, 49–50  
 Quick Energy Simulation Tool, 363

## R

radial arrays, **73**, 73  
 Radiance engine, 369  
 radii of arcs, 831–833  
 Rafter Cut option for roofs, 582  
 Rafter option for roofs, 582, 582  
 Rail Structure dialog box, 656  
 Rail Structure option, 653  
 railing tool, 674, 674

railings and handrails  
 best practices, **699–700**  
 components, **650–654**, 650–653  
 curtain walls, **670–672**, 670–671  
 curved, 684, 685  
 glass stairs, 696, 697, 698  
 inside the box, 655–658  
 joins, **662–666**, 663–666  
 outside the box, **661–672**, 662–671  
 paths, 688, 688  
 profiles, **650**, 650, 660, 674–675, 674–675  
 reference planes, 651, 651, 664, 664  
 repetitive systems, **659–661**, 659–661  
 split run stairs, 693–694, 693–694  
 wire meshes, **654–658**  
 RAM for virtualization, 917, 920, 927, 927  
 Ramp tool, 672  
 Read, Phil, 923  
 Realistic option, 53, 53  
 Realistic view, 456, 456  
 recent commands, 65, 65  
 Recent Files page, 100  
 Rectangle Checkerboard Pattern type,  
**543**, 544  
 Rectangle tool, 92  
 rectilinear form  
   generic model mass families, 320  
   in-place solids, 294, 294  
 recycled content, **341–343**, 341–343  
 redundancy, templates for, **135–136**  
 Reference Line tool, 553  
 reference lines  
   arcs, 833–834, 836  
   complex mass families, 329–330, 330–331,  
     334, 334  
   family components, **605–607**  
   generic model mass families, 319–320, 319,  
     322, 323  
   masses, **271–272**, 271–272  
   massing surfaces, **273–277**, 273–277  
   pattern-based panels, 290–292, 291–292,  
     546–550, 550  
   pyramid curtain wall pattern-based  
     families, 550–551, 551–555

- Reference Other View option, 40, 235–236
- reference planes
  - arcs, 831, 831, 833–834
  - complex mass families, 333, 333
  - family components, **605**, 605
  - parameterized, 623, 623, 629, 629, 631–632, 631, 633
  - railings, 664, 664
  - wall relationship, **24–27**, 25–28
- reference points for family components, **605**, 605
- reference shapes for massing forms, 278, 278
- Reference tool, 552
- references, datum, 19
- Reflectance setting, 371
- Region tool, **708–713**, 708–713
- regions
  - cropping, **34**, 34
  - drafting, **710–711**, 711
  - filled, 708–710, 708–710
    - boundaries, 715, 715–716
    - creating, **711–713**, 712–713
    - types, **710–711**, 711
  - masking
    - details, 708–709, 715–717, 716, **729–731**, 729–731
    - labels, 128
  - model, **711**, 711
  - names, 709
  - toposurfaces, **87–89**, 88
- Reject option for Coordination Review, 218
- Related to Mass option, 581
- relationships
  - in coordination, **195–198**, 195, 197
  - in groups, 410, 410
  - reference planes and walls, **24–27**, 25–28
  - solid and void, **616–618**, 616–618
- Relative option for keynotes, 780
- relative paths for linked models, 209
- release dates of films, 975
- Relinquish All Mine button, 185, 185
- relinquishing permissions, **185**, 185
- Reload Latest process, 179, 179
- Remove Paint tool, 496
- removing
  - design options, **415–416**
  - Design Review markups, 872
  - lines, 725
- Rename option, 219
- renaming
  - in Coordination Review, 219
  - schedules, 341
  - schemes, 812
- Render Appearance tab, 371, 371
- Render Setup dialog box, 376, 378
- rendering
  - daylighting, 376, 378
  - film and stage, **984–988**, 984–989
  - generic model mass families, 329, 329
  - light groups, 486–490, 486–489
  - photorealistic
    - film and stage, 989
    - settings, **467–470**, 467–470
  - solar studies, 449
  - visualization, **482–485**, 483–485
- Rendering dialog box
  - settings, 467, 467
  - solar studies, 449
- Rendering Settings dialog box, 482–483, 483, 485
- rentable area, 741–742
- Repeating Detail Component tool, **719–723**, 720–722
- repetitive systems for railings, **659–661**, 659–661
- Request Granted dialog box, 184, 184
- requesting permissions, **183–184**, 183–184
- Reset Points To Grid button, 547
- resolution settings, **467–470**, 467–470
- Restore Orientation And Lock View option, 821
- Results and Compare dialog box, 361–362, 361
- Retaining behavior for walls, 507
- reuse details, **761–764**, 761–764
- Reuse parameter, 799, 799
- Reveal Hidden Elements tool, 85
- Reveals dialog box, 514, 514
- reveals for walls, **514**, 514–515

- Review Warnings tool, 161
- Revision Cloud option, 863
- Revision Cloud tool, 866
- revision clouds, **863**, 864
  - leaders, **868**
  - placing, **866–867**, 866–867
  - tags, **867–868**, 868
- Revision tool, 863
- revisions
  - in live models, 866
  - overview, **863–866**, 864–865
  - revision clouds, **866–868**, 866–867
    - supplemental drawings, **868**
- Revit.ini file, 227, 948
- Revit Links tab, 212
- Revit Lookup utility, **943**, 943
- revolution vs. evolution, **12–13**, 13
- revolves, 615
- revolving sketches, 28, 28
- Rhino program, 238–240, 238–240, 974
- Ribbon, **57**, 57
  - Options Bar, **59**, 59
  - panels, **59**, 59
  - tabs, **57–59**, 57–59
- ridges for roofs, 591, 591
- rigs for pattern-based panel families, 546, 547
- Rise of the Apes*, 1015
- Riser Type setting, 673
- risers
  - circular runs, 690, 690
  - creating, 666–668, 666
  - stairs, 673
  - warnings, 669
- roles, **147–150**, 149
- Roof By Face tool, **585**
- Roof By Footprint tool, 586
- roofs, **578**
  - curved surfaces, **238–240**, 238–240
  - dormers, **586–589**, 586–589
  - by extrusion, **582–583**, 582–583
  - footprint, **578–582**, 578–582
  - in-place, **584**, 584
  - joining walls to, **79**, 79
- keynotes, 782, 782
- Roof By Face tool, **585**
- shapes, **589–590**, 589–590
- sketching, **573–574**, 573
- slope arrow, **585**, 586
- sloped drainage layers, 589, 589
- sloped glazing, **585**, 585
- sloped topping, **590–591**, 590–591
- thickness, **592**, 592
- Roofs tab, 580
- Room & Area panel, 740–741
- Room Area Computation option, 527
- Room Bounding option
  - ceilings, 577
  - roofs, 581
- Room Separation Lines option, 741
- Room tool, 364
- rooms
  - area, **740–741**, 740–741
  - color fill legends, **810–817**, 811–812, 814–818
  - heights, **364–365**, 365
  - phasing, 386, 386
  - scheduled, 42
  - tags, 740–741, 740, 791, 791
  - volumes, **364–366**, 364–366
- Rotate tool, **71**, 773
- Rotate True North command, 351
- rotating
  - buildings, 340
  - detail, 721, 721
  - elements, **70–71**, 70–71
  - text, 773
- rotation angles for complex mass families, 333, 333
- Rudder, Don, 941
- rules, filter, 440, 441
- Run Interference Check option, 223
- “Running Revit in Virtualization”, 923
- RVT files, saving groups as, 406
- RVT Link Display Settings dialog box, 211–212, 211–212
- RvtMdgDbg utility, 943

**S**

sample project, **952–954**, 952–953  
.addin manifest installation, **967–968**,  
967, 969  
Application class, **964–966**  
clsSettings class, **959–962**  
Command class, **962–964**, 962  
debugging, **969–970**  
helper subroutines, **966–967**  
user forms, **954–959**, 955  
sandwich model, 563–564, 564  
SAT files, 238–241, 240  
Save As dialog box  
  central files, 172–173, 172  
  energy models, 368  
  shared parameters, 801  
Save As View Template option, 464, 769  
Save button, 176–177  
Save Group dialog box, 761, 761  
Save Group option, 406, 406  
Save Local File Before And After  
  Synchronizing With Central option, 177  
Save Orientation And Lock View option, 821  
Save To Central dialog box, 179  
Save To New File option, 763  
Save To Target dialog box, 246  
Save Views dialog box, 764, 764  
saving  
  central files, 172–173, 172  
  groups, **406–407**, 406, 761, 761  
  at intervals, **178–179**, 178  
  multiple details, **762–764**, 763–764  
  views, 764, 764  
  work, **176–178**, 177–178  
scale  
  animated solar studies, 356, 357  
  dimensions, 794  
  elements, 74  
Scale tool, 74  
Schedule Properties dialog box  
  Appearance tab, 752, 753  
  Fields tab, 750, 750, 753–754, 891, 891  
  Filters tab, 159, 159, 751, 751  
  Formatting tab, 159, 752, 752

linked models, 210  
parameters, 800, 800  
Sorting/Grouping tab, 159, 159, 751,  
751, 754–756  
Schedule/Quantities schedules, 42, 42,  
748, 754  
Schedule tab, 752, 753  
schedules, **41–42**, **41–42**, **158**, **340–341**  
  area, 42, 754–755, 755  
  creating, 749–753, 749–753  
  cut and fill, **94–95**  
  design exercise, **427–430**, 427–430  
  design options, **414–415**, 414  
  family categories, **599**, 599  
  film and stage, **977**  
  hidden, 159  
  key, **750**, 854, 855  
  keynotes, **160–161**, 160–161, **787**  
  linked file elements, 210  
  mass floors, **849**, 849  
  masses, **264–266**, 265–266, **269–270**,  
    269–270, **848–849**, 848–849  
  multicategory, **158–159**, 158–159  
  occupancy, **856**, 856  
  parameters, 800, 800  
  parts, **890–891**, 891  
  pattern-based panels, **560–561**, 561  
  recycled content, **341–343**, 341–343  
Sheet List, **756–757**, 756  
sheets, **767–768**, 768  
sorting  
  Area, 755  
  floors, 346  
  keynotes, 160  
  materials, 342  
  Note Block, 160  
  order, 751, 751  
  pattern-based panels, 561  
  sheet lists, 756  
  Sheet Number, 157, 157  
  Walls, 754  
templates, **755**  
types, **748–749**  
walls, **753–754**  
window-to-wall ratio, **343–346**, 344–346

schematic design in Singapore Polytechnic project, **901**, 901  
 Scheme Definition dialog box, 812  
 schemes  
     color, **116–118**, 117–118  
     definitions, 812, 812  
     names, 812  
     numerical ranges, **816–817**, 817–818  
 sculptural process, **618–623**, 619–622  
 SD Sandwich Edge profile, 571–572  
 SDK (Software Development Kit), **942–943**, 942–943  
 SDs (supplemental drawings), **868**  
 Section Box option, 46, 46, 89, 464, 464  
 section boxes  
     activating, 46, 46  
     creating, **464–466**, 464–466  
     Google SketchUp, 253–254, 254  
     toposurfaces, 89  
 Section Cut Material setting, 91  
 section poches, **91**, 91  
 section tags, **129–132**, 129–132  
 Section Tags option, 129  
 sections, types, **36–38**, 36–38, **131–132**, 132  
 security in virtualization, 929, 929  
 Segment Dimension Leader Visibility setting, 796, 796  
 Select & Edit button, 375–376  
 Select All Instances option, 63, 139, 181  
 Select Items To Copy dialog box, 136, 137  
 Select Layers/Levels To Import/Link dialog box, 727, 728  
 Select Previous option, 62  
 Select Profile option, 325  
 Select Template File dialog box, 126–127  
 Selection Count, 62  
 selections  
     all instances, **63**  
     colors, 61  
     elements, **61–62**, 62  
     filters, **62–63**, 63, 65  
     templates, **598–601**, 598–600  
 Send Backwards option, **719**, 719

Send To Back option, **719**, 719  
 sequences, visualization. *See* visualization  
 set-out drawings, **878–880**, 878–880  
 Set Work Plane tool, 553  
 SetViewWorksets subroutine, **958–959**  
 Shaded view, 454, 454  
 Shaded With Edges view, 455, 455  
 shading and Shading setting  
     geometry phase, 393, 393  
     materials, 108, 610, 610  
     railings, 658, 658  
 shadowboxes, 538, 538  
 shadows  
     film and stage, **983**, 983  
     sun studies, 351–352, 352  
     working with, **457–462**, 457–462  
 Shadows settings, 352, 457, 457  
 shape-based fonts, **227–228**  
 shape handles for in-place solids, 306, 306  
 shapes  
     floors and roofs, **589–590**, 589–590  
     reference, 278, 278  
     stairs, **677–683**, 677–683  
 shared coordinate system, **199–200**, 201  
 shared folders in virtualization, **930–931**, 930–931  
 Shared Levels And Grids workset, 47, 168  
 Shared Parameter button, 800  
 shared parameters  
     annotations, 796–797, **800–807**, 801–807  
     categories, **802–803**, 802–803  
     cautions, 995  
     tags, **803–807**, 804–807  
 shared positioning of linked models, **199–200**, 201  
 Sheet Issues/Revisions dialog box, 864–867, 864, 867  
 Sheet Issues/Revisions tool, 863  
 Sheet List Properties dialog box, 756  
 Sheet List schedules, 41, 749, **756–757**, 756  
 Sheet Name category, 756  
 Sheet Number category, 756  
 Sheet view window, 48

- sheets
  - area plans, **764–766**, 766
  - in export sets, 244–245, 245
  - laying out, **764–769**, 766–769
  - schedules, **767–768**, 768
  - wall legends, 769, 769
- Sheets Of Glass setting, 371
- shelf, **628**, 628
  - brackets
    - formulas, **636–638**, 636–638
    - modeling, **629–630**, 629–630
    - nesting, **631–633**, 631–632
    - parameters, **633–634**, 633–634
    - parametric arrays, **634–636**, 634–635
  - materials, **640–641**, 640–641
  - type catalogs, **640–644**, 641–644
- Shelf Width parameter, 636
- Shift key for selections, 62
- shortcuts, keyboard, **82**, 82
- Shoulder Length setting, 796
- Show All phase filter, 394–395, 394
- Show Area option, 740
- Show Camera option, 45, 45, 471, 472
- Show Categories From All Disciplines option, 749
- Show Center option, 831
- Show Center Point option, 833
- Show Complete phase filter, 354, 354, 370, 389, 398, 399, 496, 496
- Show Demo + New phase filter, 398, 398
- Show In list, 245
- Show Leader When Text Is Moved setting, 796
- Show Mass button, 344
- Show New option, 398, 399
- Show option for permissions, 185
- Show Original option, 888
- Show Parts option, 888
- Show Placement Number parameter, 559
- Show Previous + Demo option, 396, 396
- Show Previous + New Graphic phase filter, 397
- Show Previous + New phase filter, 396, 397
- Show Previous Phase option, 396, 396
- Show Reference option, 332, 333
- Show Reference Planes option, 552
- Show Related Warnings option, 163
- Show setting for revisions, **865**
- Show Shape Handles parameter, 889
- Show Title setting, 823
- Show Workplane tool, 549
- shutdown of virtual machines, 928, 928
- shxfontmap.txt file, 227–228
- Silhouette Style option, 461, 461
- silhouettes for edges, 461–463, 461
- sills
  - detail, 717–718, 717, 722, 722
  - window, **726–733**, 726–732
- simple mass families, **311–318**, 311–317
- Simple option for fill patterns, 114
- sine function, 832
- Singapore Polytechnic, **895**, 896
  - design project, **897**
    - design development, **901–902**, 902
    - details and documentation, **902**, 903
    - massing studies, **900–901**, 900
    - schematic design, **901**, 901
    - site analysis and hand sketching, **898–899**, 899–900
    - submission drawings, **903**
    - textile design and fashion show, **898**, 898–899
  - overview, **896–897**
  - student project examples, **903–913**, 904–913
- Single-Day option, 349, 354, 448
- Single Element tool, 75
- site analysis in Singapore Polytechnic project, **898–899**, 899–900
- site context modeling, **83**, 83
  - building pads, **90–91**, 91
  - cut and fill schedules, **94–95**
  - property lines, **92–94**, 92–94
  - toposurfaces, **83–90**, 85–86, 88–90
- Site Settings dialog box, 91, 91
- size
  - crop region, 472, 472, 475
  - files, **154–157**, 155, 157–158, 920

- limiting for pattern-based panels, **556–558**, 557–558
- Size Crop button, 356, 472, 475
- Sketch mode in work plane viewer, 55, 55
- Sketch Ceiling mode, 577
- sketches
  - extrusions, 490–491, 490
  - floors, ceilings, and roofs, **573–574**, 573
  - revolving, 28, 28
  - Singapore Polytechnic project, **898–899**, 899–900
- Sky Model menu, 376, 376
- Slab Edge tool, **569**, 570
- slab edges for floors, **569**, 570
- slanted walls, 1009, 1009
- Sliver Space Tolerance setting, 367
- Slope Arrow tool, **585**, 586
- slope of roofs, 580, 580, 585
  - drainage layers, 589, 589
  - topping, **590–591**, 590–591
- Slope setting, 585
- Sloped Glazing roofs, **585**, 585
- SmartGuard, 932, 932
- SmartMount, 932, 932
- Smith, Gavin, 12
- Snakes on a Plane*
  - cockpit, 981, 981, 1001, 1002
  - production, **1001**, 1001–1002
- Snyder, Zack, 1004, 1011, 1015
- social BIM, 193–194, 880
- Soffit behavior for walls, 507
- softened lighting effects
  - film and stage, 975, 976
  - shadows, 459–460, 460–461
- Software Development Kit (SDK), **942–943**, 942–943
- solar shading in curtain systems, **852**, 852
- solar studies. *See* sun and solar studies
- Solid Form button, 547, 550
- solid panels, 528
- Solid Sweep tool, 625
- Solid tab, 252, 252
- solids
  - converting to voids, 308–309, 308, 323–324, 323–324, 618, 618
  - exporting, 252, 252
  - in-place, **294–309**, 294–309
  - overlapping on curves, 850
  - void relationships, **616–618**, 616–618
- solstices in sun studies, 347–348, 348–349, 350
- sorting schedules and Sorting/Grouping tab
  - Area, 755
  - floors, 346
  - keynotes, 160, 160
  - materials, 342
  - Note Block, 158, 158
  - order, 751, 751
  - pattern-based panels, 561
  - sheet lists, 756
  - Sheet Number, 157, 157
  - Walls, 754
- Sound Transmission Class (STC), 757
- south exposures, 343–344
- spacebar for rotating elements, **70**, 70
- spaces, 29
  - content category, 29
  - scheduled, 42
- Spacing option for repeating detail, 721
- Span Direction tool, 567
- spandrels, 538, 538
- Special Equipment category, 662
- speed of animation, 479–480
- spheres, 266–267, 267
- spider fittings, 538
- Spline Through Points option
  - intuitive massing, 280, 280
  - massing surfaces, 274, 274, 276, 276
  - wall by face mass, 282, 283
- splines
  - massing surfaces, 274–276, 274, 276–277
  - wall by face mass, 282, 283
- Split Face tool, **80**, **574–575**, 574–575
- Split Region button, 511
- split runs for stairs, **692–694**, 692–694
- Split Surface tool, **89–90**, 89–90

Split tool, 76, 76  
 Split With Gap tool, 76–77  
 splitting  
     curtain systems, 850, 850  
     lines and walls, 76–77, 76  
     wall finish materials, 511–512, 512  
 stacked walls, 523–526, 524–526  
 stacking views, 991, 991  
 staffing in BIM, 146–151, 146–147, 149  
 stage. *See* film and stage  
 stairs, 647  
     approaches, 647–650, 648–649  
     balusters. *See* balusters  
     best practices, 699–700  
     circular, 688–690, 688–691  
     components, 654  
     conditions and shapes, 677–683, 677–683  
     existing width requirements, 856  
     glass, 694–699, 695–699  
     outside the box, 684–699, 684–699  
     railings. *See* railings and handrails  
     split runs, 692–694, 692–694  
     tools, 672–673, 672–674  
 Start Post setting, 669  
 start posts, 669, 680, 696–697  
 starting views, 187, 187  
 startup of virtual machines, 928, 928  
 status bar, 52, 52  
 statutory submissions in Singapore  
     Polytechnic, 903  
 STC (Sound Transmission Class), 757  
 still image cameras, 471–473, 471–473  
 Still option for sun, 349–350, 448  
 Storefront curtain wall, 535–536, 535  
 strategy in BIM, 9–10  
 Streibig, Peter, 916, 923, 926  
 stringers, 654  
     custom profiles, 674–676, 674–676  
     split run stairs, 693  
 structural floors, 566–568, 566–568  
 structural - MEP engineer relationship, 198  
 Structural parameter, 566, 566

Structure tab  
     materials, 110, 110  
     tools, 58, 58  
 structures, wall, 503–506, 503–505  
 student activities  
     overview, 895  
 Singapore Polytechnic. *See* Singapore Polytechnic  
 styles  
     lines  
         changing, 729, 729  
         selecting, 706–707, 706–707, 725  
         setting, 105–106, 105  
     object. *See* object styles and Object Styles dialog box  
     visual, 450  
         level of detail, 451–453, 451–452  
         shadows, 457–462, 457–462  
         types, 453–457, 453–457  
 subcategories  
     creating, 493, 493  
     family components, 612–613, 612–613  
 submission drawings in Singapore  
     Polytechnic, 903  
 Subregion tool, 87–89  
 subregions of toposurfaces, 87–89, 88  
 Subscription Advantage Pack, 359  
 Subscription Center, 50  
 subtractive approach  
     selection, 62  
     templates, 135, 135  
     wall storage, 502  
 Sucker Punch, 1011–1015, 1011–1016  
 suffixes for keynotes, 775  
 summer solstice in sun studies, 347–348, 348–349, 350  
 sun and solar studies, 347, 348  
     analytic visualization, 446–450, 447–449  
     animated, 354–356, 355–357, 449, 449  
     creating, 348–354, 349–354  
     solar paths, 357, 357–358, 446–449, 447–449  
     sustainability analysis, 846, 847  
 Sun Intensity setting, 459, 459

Sun Path tool, 357  
 Sun Settings dialog box  
     multi-day studies, 355  
     settings, 349–351, 350  
     shadows, 459, 459  
     sun path, 448, 448  
 Sunlight From Top Left option, 459, 459  
 Sunlight From Top Right option, 459  
 sunlight in visualization, 482–485, 483–485  
 sunshades, 538  
*Superman*, 1015  
 supplemental drawings (SDs), 868  
 supplemental templates, 135  
 Support Depth setting, 632–633, 632  
 Support Inset setting, 636  
 support pins for treads, 696, 696  
 Surface Pattern setting, 109  
 Surface Representation dialog box,  
     545–546, 545  
 Surface Representation panel, 544–545  
 Surface tab, 545, 545  
 surface-to-floor ratio, 270, 270  
 surfaces  
     curtain walls  
         dividing, 540–543, 540–543, 550–551, 551  
         pattern editing, 544, 545  
         representation, 545–546, 545–546  
     in-place, 280, 280–281  
         pattern-based system, 284–294, 285–293  
         wall by face, 281–284, 281–284  
     massing, 273–277, 273–277  
     patterns, 109  
     roof, 238–240, 238–240  
         toposurfaces. *See* toposurfaces  
     survey points, 202–205, 202–204  
     sustainability analysis, 846–847, 847  
     sustainable design  
         concepts, 339–340  
         daylighting. *See* daylighting  
         energy modeling, 358–368,  
             358–361, 364–368  
         schedules, 340–346, 341–346  
         sun shading and solar paths. *See* sun and  
             solar studies

Sutton, Bryan, 623, 973–974  
 carving geometry, 996  
*Fantastic Four*, 999, 999–1000  
*Fantastic Four: Rise of the Silver Surfer*,  
     1002, 1002–1003  
*I, Robot*, 997–998, 998  
 on Maya use, 990  
*Night at the Museum: Battle of the  
     Smithsonian*, 1003, 1003–1004  
*Snakes on a Plane*, 1001, 1001–1002  
*Sucker Punch*, 1011–1015, 1011–1016  
 template use, 982  
*Tron Legacy*, 1008–1010, 1008–1010  
*Watchmen*, 1004–1007, 1005–1007  
*X-Men: The Last Stand*, 1000, 1000–1001  
 SWC (Synchronize With Central), 151  
     with closing Revit, 186  
     permissions, 166  
     working with, 177–178, 177–178  
 Sweep tab for floor edges, 571–572  
 sweeps, 615, 615  
     edge-based, 626, 626  
     floor edges, 571–572, 571–572  
     generic model mass families, 324, 324  
     paths, 626  
     returns, 515–516, 516  
     walls, 512–514, 513, 515  
 swept blends, 615, 615  
     glass stairs, 697  
     in-place solids, 302, 302–303  
     railing paths, 688–689, 688  
 Syafiquh, Diyannah, student project by,  
     912–913, 912  
 symbolic lines, 732, 732  
 Synchronize And Modify Settings button, 207  
 Synchronize Now option, 178, 178  
 Synchronize With Central (SWC), 151  
     with closing Revit, 186  
     permissions, 166  
     working with, 177–178, 177–178  
 Synchronize With Central option, 178  
 Synchronize With Central And Set Reminder  
     Intervals option, 178

Synchronize With Central dialog box,  
177–178, 178, 207, 208

system families

- components, 601–603, 602–603
- in design process, 29, 596
- walls, 502

system glazing panel, 533, 533

system lines, 106

system managed worksets, 47

## T

tabs on Ribbon, 57–59, 57–59

Tachyon corridor, 1005, 1006

Tachyon panel, 1006, 1007

Tag All command, 790–791, 790

Tag All Not Tagged dialog box, 791, 791

Tag All Not Tagged tool, 128

Tag By Category tool, 93, 128, 790, 790,  
806, 867

Tag On Placement option, 128, 789

Tag panel, 789, 789

tags

- doors, 127–128, 127–128
- elevation, 35, 132–134, 133–134
- inserting, 789–790, 789
- in linked files, 210
- overview, 788–789, 788
- property lines, 93–94, 93–94
- revision clouds, 867–868, 868
- room, 740–741, 740, 791, 791
- section, 129–132, 129–132
- shared parameters, 803–807, 804–807
- text vs. labels, 126–127, 126
- tools, 790–794, 790–794
- views, 129–134, 129–134

Tags dialog box, 128, 789

Tammik, Jeremy, 970

tangent function, 832

targets for cameras, 44, 44

teams

- adding members, 150–151
- coordinating, 234, 234

loading work from members, 179, 179  
worksharing, 151–153, 152–153

templates

- balusters, 651, 651
- conceptual massing, 329, 329
- custom, 134, 135
- data aggregation, 136–139, 137–139
- details, 725
- film and stage, 982
- generic model, 318, 318
- managing, 135–139, 137–139
- mass, 310, 310
- overview, 99–100
- parametric projects, 829, 829
- pattern-based panels, 288, 289
- saving, 464, 464
- schedules, 755
- selection, 598–601, 598–600
- views, 123–124, 124
- visibility, 187, 187

Temporary Dimension Properties dialog box,  
67, 67

temporary dimensions, 66–67, 66–67  
text

- annotations, 772–775, 772–775
- dimension, 795, 795
- documents, 641, 641
- exporting, 243, 250–252, 251
- vs. labels, 126–127, 126

Text & Fonts tab, 243, 250–252, 251

Text Document option, 641, 641

Text Location setting, 796

Text tag, 950

Text tool, 772, 772

textile design in Singapore Polytechnic  
project, 898, 898–899

textnotes, 775–776, 776

thick floor finishes, 575–576, 576

thickness

- roof layers, 592, 592
- walls, 505, 512

Thickness setting, 505

thin floor finishes, 574–575, 574–575

- Thin Lines option, 608  
third-act sets, 977  
3D axonometric views, 486  
3D data  
  exporting, 253–257, 254–257  
  importing, 236–242, 238–240, 242  
3D Snapping option, 552–553  
3D view window, 48  
3D views, 31, **819**  
  annotating, **821**, 821  
  orienting, **819–820**, 819–820  
  types, **42–46**, 43–46  
3ds Max Design application, 369,  
**372–379**, 372–379  
time  
  in phasing, **383–385**, 383–385  
  virtualization settings, 929, 929  
Ting, Ong Wan, student project by,  
**907–908**, 908  
Tocci, John, 193, 881  
Tocci Building Corporation case study, **881**  
  construction visualization,  
**881–882**, 881–882  
  design to fabrication, **885–886**, 885–886  
  integrated project delivery  
  planning, **882–884**  
Toggle Slope Defining option, 580  
TooltipImage tag, 950  
Top/Base Attach tool, 588  
Top Extension Distance parameter, 517–519  
Top Is Attached parameter, 522  
Top Offset setting  
  balusters, 660  
  walls, 519  
Topography tab, 89  
toposurfaces, **83–84**, 84  
  creating, **84–87**, 85–86  
  dividing, **89–90**, 89–90  
  section poches for, **91**, 91  
  subregions, **87–89**, 88  
Total Frames setting, 479, 479  
Transfer Project Standards tool, 111, 124,  
136, 515  
Transfer View Scale option, 139  
transparency and Transparency setting  
film and stage, **982**, 982  
materials, 610, 610  
railings, 657  
temporary dimensions, 67  
transportation components as railings,  
660–661, 661  
Trapezoid Corner Mullion type, 534  
treads  
  adding, 669, 669  
  depth and thickness, 654  
  glass stairs, 695–698, 695–697  
  nosing profiles, 672–673, 672–673  
  supports, 677–678, 677–678, 680–683, 680,  
  686, 687  
Trelligence Affinity application, 818  
Triangle (Flat) pattern, 286, 286, 289, 289  
triangles, formulas for, 832  
trigonometry, 832  
trim details, 716  
Trim/Extend Multiple Elements tool, 75, 520  
Trim/Extend Single Element tool, 75, 520  
Trim/Extend To Corner tool, 75, 534  
trimming lines and walls, **75–76**, 75  
*Tron Legacy*, **1008–1010**, 1008–1010  
true north, 200–201, 351  
TrueType fonts, **227–228**  
Truss option, 582, 582  
tubular structure, chair with,  
**623–628**, 623–628  
twists, 319–320  
2D and orthographic View Control bar, 450, 450  
2D data  
  exporting, **247–253**, 247–253  
  importing, **232–236**, 234–236  
2D views, 31  
TXT files, **777–778**, 777–778  
type catalogs, **640–644**, 641–644  
Type Of Parameter setting, 120, 798, 801  
Type Or Instance Parameter setting, 799  
type parameters  
  family components, **613–614**, 614  
  vs. instance, **30**, 31  
  purpose, 799

Type Properties and Type Properties dialog box  
 color fill legends, 815, 816  
 dimensions, 795–796, 795–796  
 filled regions, 710–711, 710  
 lights, 490, 490  
 poches, 465, 465  
 Project Browser, 51, 51  
 pyramid curtain walls, 554  
 railings, 652, 652, 656  
 regions, 715  
 repeating detail, 720–721, 720, 722  
 room area, 740  
 section types, 132  
 shelf, 632, 632  
 stairs, 669, 669  
 text, 773–774, 773  
 view tags, 129, 129  
 viewport types, 822–823, 822  
 walls, 30, 31, 502, 502, 505, 508–511, 508

Type Selector  
 accessing, 50, 64, 64  
 ceilings, 577  
 curtain walls, 527–529, 537  
 pattern-based panels  
   changing patterns, 547  
   loading, 550  
   nesting, 557  
   predefined panels, 543  
   pyramid curtain walls, 554  
   scheduling, 560  
 text, 773, 773

## U

U grid for curtain walls, 541–542, 545, 546  
 U Grid Rotation setting, 542  
 U Grid tool, 541–542  
 Unattached End option, 790  
 undo disks for virtualization, 933, 933  
 Uniform Speed option, 479  
 United States, energy use in, 358, 358  
 units  
   daylighting, 372, 373  
   importing, 229

Units & Coordinates tab, 252, 252  
 Units Setup dialog box, 372, 373  
 Unlock View option, 821  
 unlocked references, 305, 305  
 Unresolved References dialog box, 759, 759  
 unused items, deleting and unloading, 154–155, 155  
 Update Extents option, 219  
 Update To Face option, 282, 283, 853  
 Updates tab, 189, 189  
 Upper Limit setting, 365  
 usable area, 742–744  
 USB devices for virtualization, 939, 939  
 Use Project Settings option, 128  
 User-Created worksets, 168–169  
 user-defined keynotes, 777, 785, 785  
 user-defined parameters, 443–445, 443–445  
 user forms  
   class constructors, 956  
   controls, 954–956, 955  
   helper subroutines, 957–959  
 user interface, 48, 48  
   Application menu, 48, 49  
   drawing area, 52, 52–53  
   graphic display options, 54, 54–55  
   InfoCenter, 50, 311  
   massing, 310, 311  
   Navigation bar, 57, 57  
   Project Browser, 51, 51  
   Properties palette, 50, 50  
   Quick Access toolbar, 49, 49–50  
   Ribbon, 57–59, 57–59  
   status bar, 52, 52  
   View Control bar, 53, 53  
   ViewCube, 56, 56  
   work plane viewer, 55, 55  
 User Keynote tool, 785, 785  
 User keynotes, 785, 785  
 user managed worksets, 47  
 User option for keynotes, 777  
 UV grids  
   curtain walls, 540–546, 541–542, 546  
   pattern-based panel families, 546  
 UVW coordinate system, 539, 542

**V**

V/G Overrides Worksets option, 187  
 V grid for curtain walls, 541–542, 545, 546  
 V Grid Rotation setting, 542  
 V Grid tool, 541  
 valleys for roofs, 591, 591  
 variable thickness for roof layers, 592, 592  
 variables, 956, 959–960  
 VendorDescription tag, 949  
 VendorId tag, 949  
 Vertical Opening tool, 583, 583  
 vertical structure settings for walls, 505  
 vertices for in-place solids, 296  
 Video Compression dialog box, 356, 356  
 video for solar studies, 354–356, 355–357  
 video hardware for virtualization, 936, 936  
 View Control bar, 53, 53
 

- sun path, 447
- visual styles, 450, 450

 View Extents settings, 45  
 View List Properties dialog box, 156–157, 156–157  
 View List schedules, 41, 749  
 View option for legends, 758  
 View Range dialog box, 33, 33, 819, 819  
 View Range option, 39  
 View/Sheet Set tab, 244, 244  
 View tab for templates, 187  
 View Templates dialog box, 123–124, 124, 464, 464  
 View Templates option, 769  
 View Templates panel, 187, 187  
 view titles, 765–766, 766  
 View Zoom control, 57  
 ViewCube, 56, 56, 367  
 Viewer option, 55, 55  
 views and View tab, 31, 31, 58, 58, 118
 

- 3D, 42–46, 43–46, 819
  - annotating, 821, 821
  - orienting, 819–820, 819–820
- activating, 766
- animation paths, 473, 473
- arranging elements, 718–719, 718–719

assemblies, 892, 893  
 callouts, 38–39, 38–39  
 creating, 32–34, 32–34  
 cropping, 34, 34, 44, 44  
 daylighting, 370, 372, 372  
 deactivating, 766  
 in design process, 597, 597  
 documentation, 42  
 drafting, 40, 40  
 duplicating, 32–33, 33  
 elevations, 35–36, 35  
 in export sets, 244–245  
 exporting, 372–379, 372–379  
 filters, 121–122, 122, 156, 156  
 importing and linking, 763–764, 764  
 legends, 40, 40–41, 757, 786  
 linked data, 235–236  
 monochromatic, 437–440, 438–440  
 number of, 155–157, 156–157  
 organizing, 119–121, 119–121  
 pattern-based panel scheduling, 561  
 phasing, 381–383, 386, 387, 394–400, 394–399  
 photorealistic visualization, 470–471, 470  
 ranges, 33, 33  
 rendering, 467  
 saving, 764, 764  
 schedules, 41–42, 41–42, 94, 158, 269, 341, 414–415, 414, 749  
 sections, 36–38, 36–38, 132  
 settings between, 769  
 solar studies, 348  
 stacking, 991, 991  
 starting, 187, 187  
 sun studies, 352–354, 352–354  
 tags, 129–134, 129–134  
 templates, 123–124, 124  
 viewport types, 822–823, 822–823  
 visibility, 231  
 visual styles, 453–457, 453–457  
 window-to-wall ratio, 346  
 windows, 48, 48  
 Views worksets, 169

virtual machines, 918, **921–923**, 921  
 virtualization, **916**  
   advantages, **918–920**  
   Bohlin Cywinski Jackson. *See* Bohlin Cywinski Jackson (BCJ)  
   guest computers, **918**  
   host computers, **917**  
   limitations, **920**  
   overview, **915–917**, 917  
   virtual machine creation, **921–923**, 921  
 visibility and Visibility/Graphic Overrides dialog box  
   boundary lines, 766  
   color fill legends, 814–815  
   curtain wall surfaces, 545  
   design options, 414, 414  
   detail components, **733–734**, 733–735  
   extrusions, 627, 627  
   family components, **607–609**, 608–609  
   filters, 384–385, 385, 440–442, 441, 444, 444  
   imported data, **229–231**, 230–231, 760  
   lighting fixtures, 490  
   line patterns, 104  
   linked models, **211–212**, 211–212  
   parts, 889  
   points, 202  
   solar studies, 349  
   templates, 187, 187  
   views, **123–124**  
   window-to-wall ratio, 344  
   worksets, 179–180  
 Visibility Settings tool, 733  
 VisibilityMode tag, 950  
 Visible In View selection option, 63  
 Visible option, 627, 627  
 Visual Studio 2010, **951–952**, 951–952  
 Visual Studio for Applications (VSTA), 941, 948  
 visual styles, **450**  
   level of detail, **451–453**, 451–452  
   shadows, **457–462**, 457–462  
   types, **453–457**, 453–457

visualization, **5–7**, **5–8**, **435**  
 analytic. *See* analytic visualization  
 film and stage, **984–988**, 984–989  
 geometry and cameras, **481–482**  
 photorealistic. *See* photorealistic visualization  
 role, **435–457**  
 sequence and workflow, **480–481**  
   artificial lighting, **485–486**, 485  
   geometry and cameras, **481–482**  
   light groups, **486–495**, 486–495  
   materials, **496**, 496  
   sunlight, **482–485**, 483–485  
 Tocci Building Corporation case study, **881–882**, 881–882  
 worksharing, **188–191**, 188–191  
 VMware, 916  
   in BCJ, 927–928  
   P2V technology, 922–923  
 VMware Converter, 922  
 Void Sweep option, 571–572, 571  
 voids  
   converting solids into, 308–309, 308, 323–324, 323–324, 618, 618  
   as solids, 306, **308**, 308  
   solids relationships, **616–618**, 616–618  
 volume-to-floor ratio, 270, 270  
 volumes in energy modeling, **364–366**, 364–366  
 VSTA (Visual Studio for Applications), 941, 948

## W

Walkthrough Frames dialog box, 479, 479  
 Walkthrough views, 42  
   animation paths, 473–474, 473–474  
   editing, 476–477, 477  
   frames, 479, 479  
   properties, 475, 475  
   section boxes, 46  
 wall by face mass, **281–284**, 281–284  
 Wall Closure parameter, 509  
 Wall Enclosure parameter, 509

- Wall Finish setting, 366  
 wall-hosted plumbing fixtures, 602, 602  
 Wall Joins tool, 520, 520–521  
 Wall sections, 36–37  
 Wall Sweeps dialog box, 513–514, 513  
 Wall Sweeps tool, 516  
 Wall Tags category, 804, 805  
 walls, **501**  
     articulation, **510–516**, 510–516  
     attaching, **521–522**, 521–522  
     copying, 215  
     cores, **506**, 506–507  
     creating, **22–23**, 22–24, **502**, 502  
     curtain. *See* curtain walls  
     finish face materials, **511–512**, 512  
     Function type property, 507, 507  
     geometry phase, **390–393**, 391–393  
     Google SketchUp, **253–255**, 254–255  
     in groups, 402, 402  
     in-place, **262–264**, 263, **523**, 523  
     joining  
         editing, **519–521**, 519–521  
         to floors and roofs, 79, 79  
         limitations, 210  
         links vs. groups, 408, 408  
     layers, 505, 507, 507  
         extending, **517–519**, 517–519  
         Layers table, **503–504**, 504  
         merging, 512, 512  
         wrapping, **505**, 505, **508–510**, 508–510  
     legends, **758–759**, 758–759, 769, 769  
     materials, **504–505**, 504  
     Model In Place, 27, 27  
     offsetting, 77, 77  
     perspective views, 26, 26  
     profiles, 22–23, 22, **521–522**, 521–522  
     reference plane relationship, **24–27**, 25–28  
     reflectance settings, 371  
     reveals, **514**, 514–515  
     roof attached to, 240, 240  
     rotating, 70, 70  
     schedules, **753–754**  
     slanted and curved, 1009, 1009  
     splitting, **76–77**, 76  
     stacked, **523–526**, 524–526  
     STC, 757  
     structure, **503–506**, 503–505  
     sweep returns, **515–516**, 516  
     sweeps, **512–514**, 513, 515  
     trimming and extending, **75–76**, 75  
     wild, 982  
 Walls tab  
     design options, 412  
     dormers, 588  
 warnings  
     area plans, 747, 747  
     overview, **161–163**, 161–162  
 Warnings dialog box, 161, 747, 747  
 Watchmen  
     apartment, 992, 993  
     CGI work, **990**, 991–992  
     detail, 977  
     glazing, 977  
     green screens, 981, 981  
     production, **1004–1007**, 1005–1007  
 water closets, 857  
 WCPL parameter, 335, 335  
 weather data, **375**, 376  
 Weather Data File button, 375  
 Whaley, Mike, 873–874  
 White Point setting, 488  
 white screen of death, 919–920  
 whole-building BIM, 17  
 Wide Line silhouettes, 461, 461  
 Width setting  
     animated solar studies, 356  
     labels, 128  
 Wikipedia for parametric models, 861  
 wild walls, 982  
 window family details, **726–733**, 726–732  
 window sills, 722, 722, **726–733**, 726–732  
 window-to-wall ratio (WWR),  
     **343–346**, 344–346  
 windows, selection, 62  
 Windows tab, 508  
 winter solstice in sun studies, 348, 349  
 wire meshes for railings, **654–658**, 655–658

Wireframe view, 453, 453, 489, 489  
 Wolfram Alpha site for parametric models, 861  
 Work Plane dialog box, 491, 491  
 Work Plane panel, 19, 55, 55, 549  
 work plane viewer, 55, 55  
 work planes  
     curtain walls, 549  
     generic model mass families, 320, 320  
     in-place solids, 303, 303  
     lighting, 491, 491  
     masking regions, 731, 731  
     reference planes, 19  
 work plans, 150  
 workflow  
     BIM, 141–145, 142–146  
     visualization. *See* visualization  
 working space, 52, 53  
 worksets and Worksets dialog box, 47, 47, 152–153, 152, 165  
     central files, 172–173, 172–173  
     changing, 188, 188  
     copying with, 69  
     element ownership in, 181–191, 181–191  
     entourage, 495, 495  
     linked models, 208–209  
     loading work from team members, 179, 179  
     local files, 173–176  
     moving elements between, 179–181, 180  
     number of, 170  
     organizing, 170–171, 171  
     ownership data, 174, 174  
     permissions, 173, 173, 181  
     saving work, 176–178, 177–178  
     structure, 169  
     types, 168–169  
 Worksets tab, 190, 190

worksharing, 165  
 basics, 165–166, 166  
 in design process, 597  
 disabling, 186, 186  
 film and stage, 997  
 in large teams, 151–153, 152–153  
 linked models with, 206–209, 207–208  
 using, 167–168, 167–168  
 visualizing, 188–191, 188–191  
 worksets. *See* worksets and Worksets dialog box  
 Worksharing dialog box, 167, 168  
 Worksharing Display Settings dialog box, 188–189, 189  
 Worksharing Update Frequency option, 190  
 Workstation Extreme product, 920  
 Wrapping At Ends setting, 508  
 Wrapping At Inserts setting, 508–509  
 wrapping layers, 505, 505, 508–510, 508–510  
 Wright Flyer, 1003, 1003  
 WWR (window-to-wall ratio), 343–346, 344–346

## X

*X-Men: The Last Stand*  
 production, 1000, 1000–1001  
 realism, 976, 976  
 X-ray view, 297–298, 298  
 Xref Views On Sheet option, 200

## Y

Yue, Chen, student project by, 912–913, 912–913

## Z

Zoom To Sheet Size option, 608, 609